SEPTEMBER
1953

THE INDUSTRY'S RECOGNIZED AUTHORITY

ROCK PRODUCTS

LARGEST PRODUCER CIRCULATION IN THE HISTORY OF THE FIELD

Lightweight aggregate plant of
Kentucky Light Aggregates, Inc.
subsidiary of Ohio River Sand Co, Inc.

LOWER YOUR COST-PER-TON FOR CRUSHED STONE!

WILLIAMS *Heavy Duty* HAMMER MILLS

With a Williams, you don't need a primary crusher and another two or more secondary grinders — because *a single Williams Hammer Mill does the complete job in one operation!*

That means no additional machines are necessary — no extra foundations, housing, conveyors, drives or other equipment — *a saving up to 75% on initial investment!* And because a Williams does the job faster and better, you can *cut your crushing costs up to 50%!*

There's a Williams to suit *your* specific need, no matter what it is! It will pay you to *get the facts now!*

TYPICAL WILLIAMS HAMMER MILLS AND WHAT THEY CAN DO

SUPER-SLUGGER	Crushes power-shovel-loaded stone to 1½", ¾" — even to 8 mesh — in one operation! Capacities up to 550 tons per hour.
SLUGGER	Reduces 100-pound stone to 1½", ¾" or agstone — in one operation! Capacities up to 100 tons per hour.
NF and GA TYPES	Reduce 4" stone to ½", agstone — or as fine as 20 mesh — in one operation! Capacities up to 200 tons per hour.

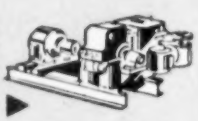
OTHER WILLIAMS EQUIPMENT

ROLLER MILLS
—IMPACT and DRYER MILLS
—for fine grinding to 400 mesh or micron sizes

AIR SEPARATORS
— any type; for precision control and high production in fine grinding

VIBRATING SCREENS
— in any size for any job. 1 to 3 decks, open or enclosed.

HELIX-SEAL MILLS
— for dust-free grinding, and for wet, sticky, greasy materials.



Also: COMPLETE "Packaged" PLANTS for crushing, grinding, separating.

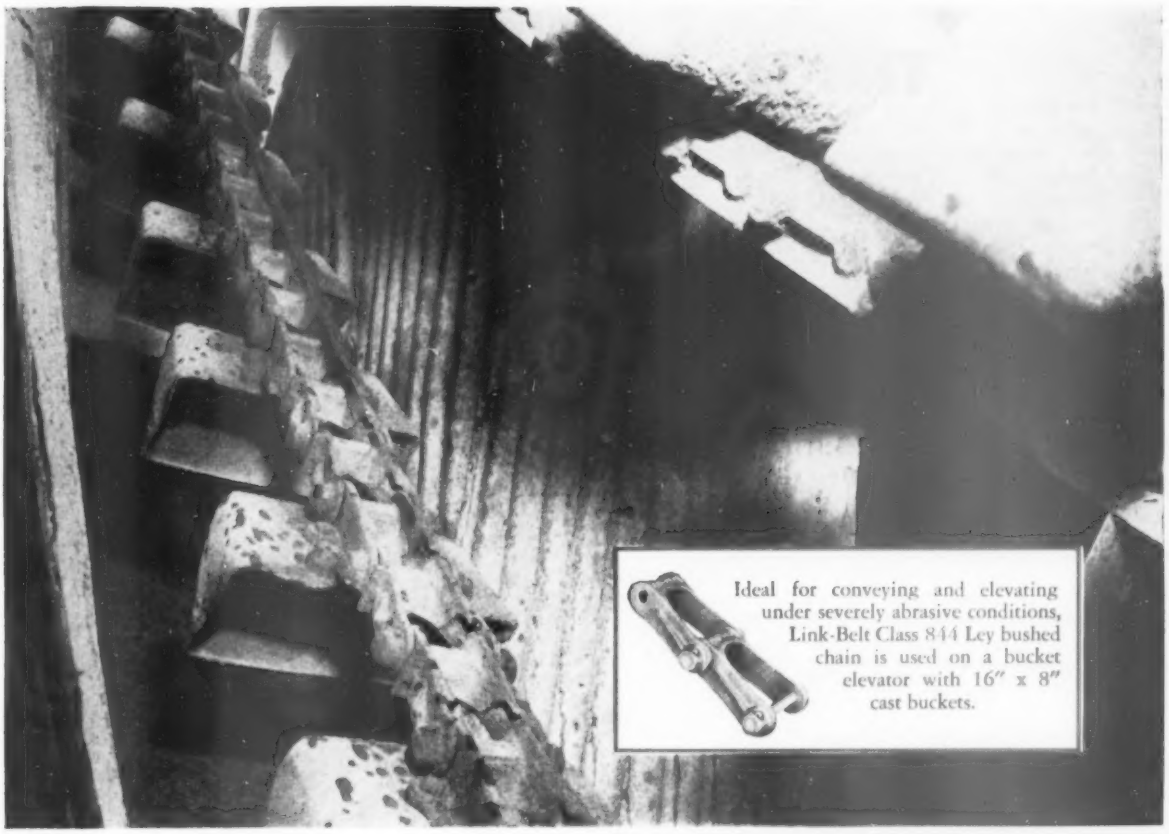
WILLIAMS PATENT CRUSHER AND PULVERIZER CO.
800 St. Louis Avenue — St. Louis 6, Mo.

WILLIAMS

CRUSHERS GRINDERS SHREDDERS

OLDEST AND LARGEST MANUFACTURER OF HAMMER MILLS IN THE WORLD

Is there ONE chain that best meets your drive or conveyor problem?



Ideal for conveying and elevating under severely abrasive conditions, Link-Belt Class 844 Ley bushed chain is used on a bucket elevator with 16″ x 8″ cast buckets.

You'll find the answer in LINK-BELT's complete chain line... a size and type for every job

The application shown above is an example of how you can select the *one* chain best suited for a particular need from the complete Link-Belt line. And each chain is engineered to provide more efficient service at lower cost than so-called general purpose chain.

Whatever your requirements, you are assured of the *right* chain for the job when you rely on Link-Belt. And, remember—a chain bearing the Link-Belt double >——< arrow is your guarantee of longer chain life.

For information on the complete Link-Belt chain line, see the Link-Belt representative near you. He has the answers for efficient, low-cost drive and conveying chain performance.

LINK-BELT

CHAINS AND SPROCKETS

Typical chains from the complete LINK-BELT line

Class SS bushed roller chain with straight sidebars — for practically any conveying or elevating service.

Class SS bushed roller chain with offset sidebars — for heavy drive service at moderate speeds.

Class C combination chain — popular, durable, low cost design for elevators, conveyors.

Link-Belt "Flint-Rim" cast sprockets give extra long life. Cast steel sprockets for most severe service.

LINK-BELT COMPANY: Plants: Chicago, Indianapolis, Philadelphia, Colmar, Pa., Atlanta, Houston, Minneapolis, San Francisco, Los Angeles, Seattle, Toronto, Springs (South Africa), Sydney (Australia). Sales Offices, Factory Branch Stores and Distributors in Principal Cities. 13.181-G

ROCK PRODUCTS

SEPTEMBER, 1953 — THE INDUSTRY'S RECOGNIZED AUTHORITY — VOL. 56, No. 9

Bror Nordberg
Editor

Nathan C. Rockwood
Editorial Consultant

This Month

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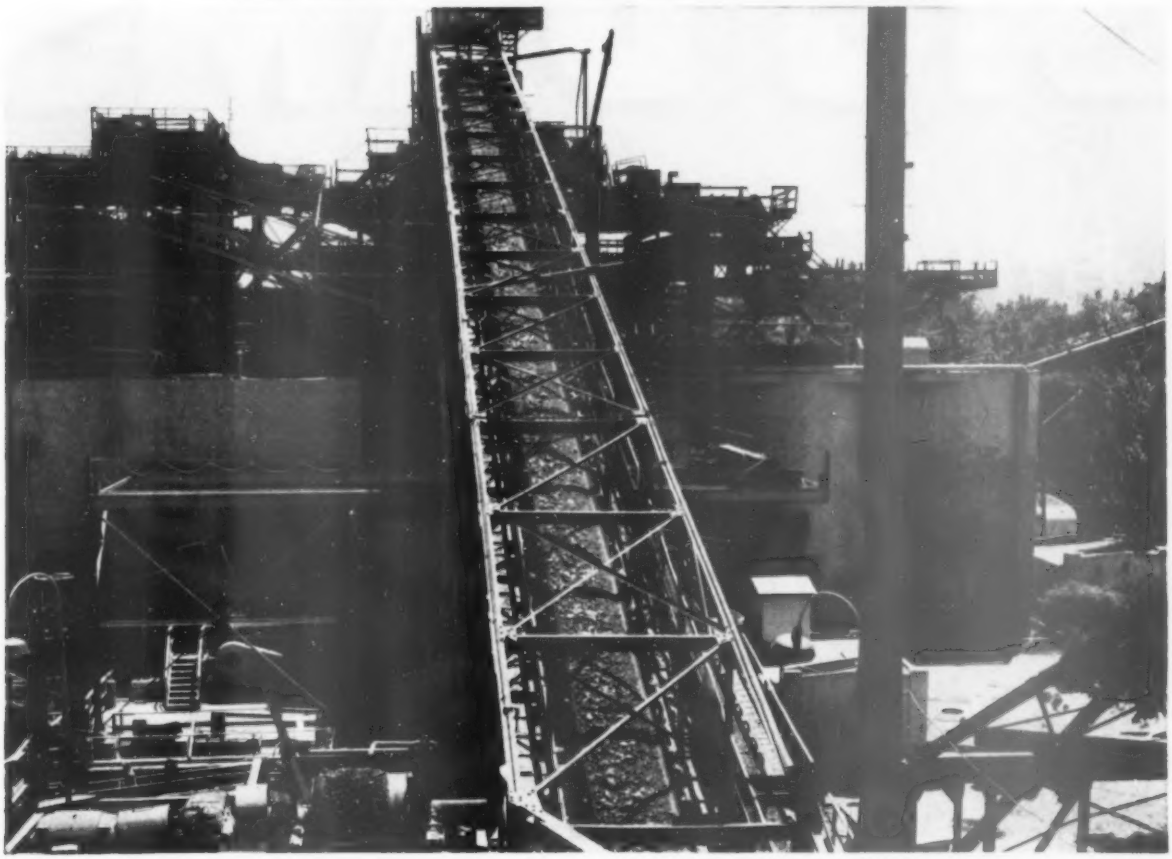
To Subscribers — Date on wrapper indicates issue with which your subscription expires. . . In writing to have address changed, give old as well as new address.

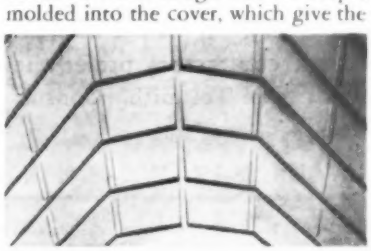
RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER



Wet, slippery gravel climbs uphill on steps of rubber

GETTING tons of gravel up that steep incline was causing plenty of trouble at this plant. A conveyor belt was used but the gravel is so wet it often slipped *down* faster than the moving belt could carry it *up*.

Then a B. F. Goodrich man told the company that BFG had developed a special belt, called Riffle Grip, to meet just such problems. Its cover has a series of extra-tough rubber steps, molded into the cover, which give the belt its nonslip, gripping action. The patented Riffle Grip belt was tried at the gravel company, and as you see, it works perfectly.



Even at the high belt speed needed to move 1200 tons an hour, the rubber tread holds the gravel safely, surely. The water runs off to the sides. Yet just by changing the incline angle and adjusting the troughing idlers, this same BFG belt can haul such sloppy materials as wet mixed concrete and keep the water from draining away.

The B. F. Goodrich Riffle Grip belt is now at work in other gravel plants, on gold dredges, in concrete plants and other places where wet, sloppy materials must be carried up steep grades. It's making many mining and construction jobs cheaper, more efficient. To get further information on the unusual Riffle Grip belt, simply send the coupon below, or call in your nearest BFG distributor.

The B. F. Goodrich Company
Dept. M-74, Akron 18, Ohio

Without cost or obligation, please
- ☐ send me more information on the Riffle Grip belt.
- ☐ have a BFG distributor call on me.

Name _____

Company _____

Address _____

_____

Conveyor Belts BY
B.F.Goodrich

BIG DAMS

built with TELSMITH EQUIPMENT

Grand Coulee Dam, Washington

● On one big dam project after another . . . all over the world . . . you'll find Telsmith-Engineered Aggregate Plants and Telsmith Equipment. Prominent contractors prefer the dependable performance of Telsmith. Consult Telsmith engineers.

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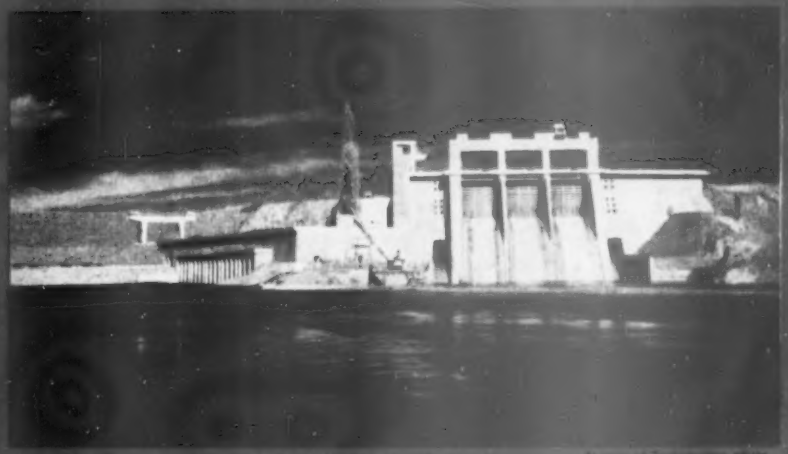
Clyde Eqpt. Co., Portland 9, Ore., & Seattle 4, Wash. • Rish Eqpt. Co., Charleston 22, & Clarksburg, W. Va.—Roanoke 7, & Richmond 10, Va.

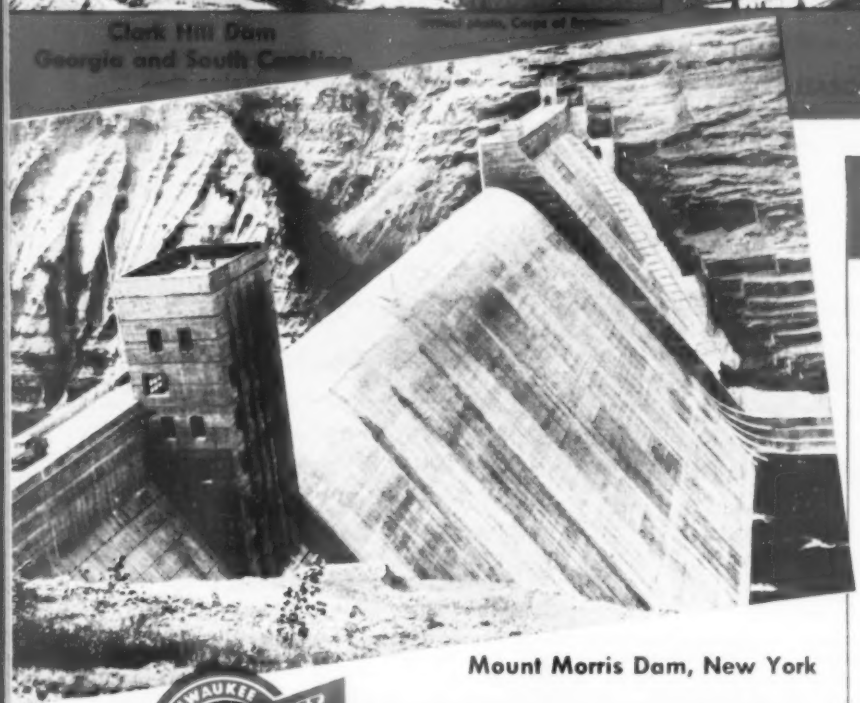
Center Hill Dam, Tennessee



Davis Dam, Arizona

Clark Hill Dam
Georgia and South Carolina

Piave River Dam, Italy



Mount Morris Dam, New York

OTHER DAMS Built With TELSMITH Equipment

- Alatoona Dam, Georgia
- Ariel Dam, Washington
- Boysen Dam, Wyoming
- Buggs Island Dam, Virginia
- Carpenter Dam, Arkansas
- Cascade Dam, Washington
- Conowingo Dam, Maryland
- Dale Hollow Dam, Tennessee
- El Presidente Dam, Mexico
- Folsom Dam, California
- Fort Gibson Dam, Oklahoma
- Kortes Dam, Wyoming
- Morony Dam, Montana
- Norfork Dam, Arkansas
- Philpott Dam, Virginia
- South Holston Dam, Tennessee

MILWAUKEE TELSMITH WIS. U.S.A.

Send for Bulletin 266

MS-13

Here's how Traylor Bell Heads and Curved Concaves Increase Plant Capacities and Lower Costs

The self-tightening bell head and curved concaves of a Traylor TY Reduction Crusher will increase capacities of your plant by checking choking and packing. Efficient application of crushing force produces a better, more uniform product with a lower percentage of oversize and waste fines . . . reduces power waste and costs to a minimum. Mail coupon today for free bulletin giving complete details on efficient, economical Traylor TY Reduction Crushers.

Traylor REDUCTION CRUSHERS

Send For This Free Bulletin *Contains complete details on Traylor TY capacities and sizes. Mail coupon today.*

TRAYLOR ENGINEERING & MANUFACTURING CO.
1525 MILL ST., ALLENTOWN, PA.

Send me the latest bulletin on Traylor TY Reduction Crushers. I want to see why a Traylor TY can handle larger rock from the primary breaker.

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*Company*_____

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SALES OFFICES: New York • Chicago • San Francisco
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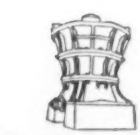
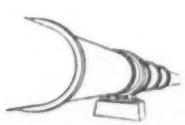
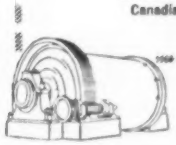
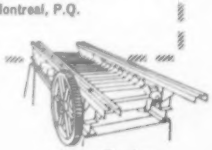

Primary Gyratory Crushers


Rotary Kilns

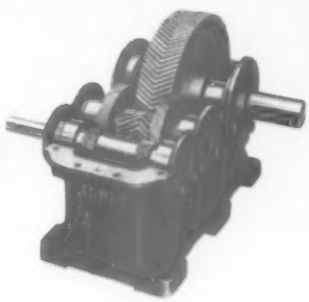

Secondary Gyratory Crushers


Ball Mills


Jaw Crushers


Apron Feeders

One of two new Allis-Chalmers kilns at Basic Refractories Inc. Maple Grove, Ohio plant. Dual drives engineered by Allis-Chalmers Mfg. Co. and W. A. Jones Foundry & Machine Co.



Driving a non-stop giant size rotary kiln calls for PLUS PERFORMANCE

That's why Basic Refractories selected JONES HERRINGBONE GEAR SPEED REDUCERS to drive two new rotary kilns — the largest in the world's refractory industry — at their Maple Grove, Ohio dolomite processing plant.

Operations at Basic are continuous. In processing, dead burned dolomite must be constantly *ON THE MOVE* — a drive failure could result in serious damage from the hot mixtures in the kiln.

Naturally, Basic Refractories' engineers took utmost care in the drive component selection for this important application. And, naturally, they chose JONES HERRINGBONE GEAR DRIVES because of their proven ability to stay on the job and take the 'round-the-clock, day-in and day-out punishment of continuous operation.

Giving PLUS PERFORMANCE under these and similar conditions is nothing new for any type Jones Speed Reducer — all are recognized and accepted throughout industry for all sorts of applications demanding rugged dependability, maximum capacity and quiet, smooth, power transmission.

BIG DRIVES — SMALL DRIVES — You may not have a giant kiln to drive; but when you have a power transmission job, big or small or anything in-between, your best answer is JONES . . . it has been for over 60 years.

W. A. JONES FOUNDRY & MACHINE CO. 4447 West Roosevelt Road, Chicago 24, Illinois

Ask for Catalog 70

Since 1890 . . . In the Service of Industry

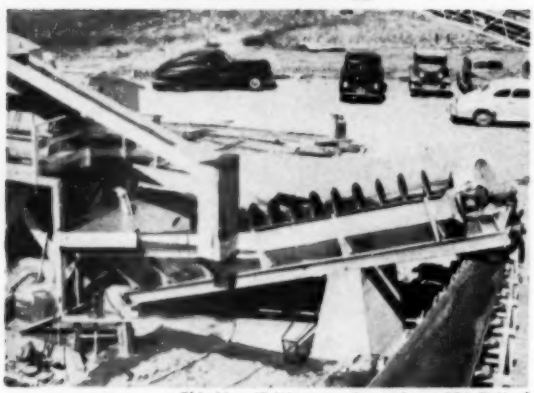
Jones

HERRINGBONE — WORM — WORM HELICAL — GEAR SPEED REDUCERS
CAST IRON PULLEYS • CUT GEARS • V-BELT SHEAVES
ANTI-FRICTION PILLOW BLOCKS • FLEXIBLE COUPLINGS

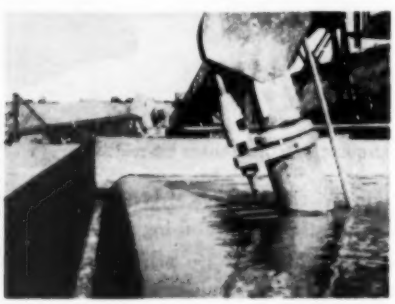
Why do so many operators prefer

WEMCO SAND PREPARATION MACHINES?

In recent years—since the introduction of modern designed Wemco Sand Preparation Machines—more and more operators have expressed their preference for Wemco units. Proof of their preference is shown by the large number of repeat orders. But what are the reasons? In general, operators name these three:



This No. 48 Wemco unit produces 100 TPH of concrete specification sands.



No. 78 Wemco Sand Preparation Machine. Note large overflow and quiet pool action for retention of +200 mesh fine sands.

1 ABILITY TO PRODUCE SPECIFICATION SANDS

Many Wemco units are preparing sands graded from a few percent +4 mesh down to a few percent −200 mesh. For example, Wemco machines not only meet the California State Specifications for Portland Cement Concrete (listed below)—but they do so at high rates of production on sands requiring thorough washing and elimination of up to 15% −200 mesh slime, clay and other colloidal deleterious materials.

CALIFORNIA STATE SPECIFICATIONS
Concrete Sands Used With Portland Cement

Sieve Size	% Passing	Sieve Size	% Passing
⅜"	100	50-m	10-20
4-m	90-100	100-m	2-8
8-m	65-90	200-m	0-4
16-m	45-70	270-m wash	0-3
30-m	25-45		

2 HIGH CAPACITIES

Wemco units, in meeting such specifications as above, retain their high productive capacity. For example, one No. 60 Wemco machine is producing 200 TPH of specification concrete sand with only 0.9-1.5% −200 mesh content in sands. The large weir overflow on Wemco units provides for a high rate of removal of slimes, clay, mud and other waste materials while valuable fine sands are retained in the settling tank. Spiral conveying units with high raking capacity assure clean, dry sands which can readily be transported on steeply sloping conveyor belts.

3 LOW MAINTENANCE COSTS

The sturdy construction and nearly automatic operation of Wemco machines result in less maintenance, horsepower, operator attendance and down time costs. For instance, one operator using two No. 78 Wemco units produced 1,790,000 tons of sand with replacement parts costs running only 4/100ths of a cent per ton of feed. Results like this prove Wemco Sand Preparation Machines cost less to operate, **yet produce specification sands at high rates of capacity.**

These are some of the reasons why so many progressive operators prefer Wemco units. Simply stated, it's because they can do a job other machines cannot do. Why not drop Wemco a line—no obligation, of course—and let us advise you on your sand production problems. And—request Wemco Sand Preparation Bulletin C-1-0-2

WEMCO
WESTERN MACHINERY COMPANY
760-766 FOLSOM STREET · SAN FRANCISCO 7, CALIFORNIA

Mobil Mills • Coal Spirals • HMS Thickeners • HMS Pumps • Sand Pumps • Agitators Cone Separators • Drum Separators • Hydroseparators • Fagergren Laboratory Units Fagergren & Steffensen Flotation Machines • S-H Classifiers • Attrition Machines HMS Laboratory Units • Dewatering Spirals • Thickeners • Conditioners • Densifiers

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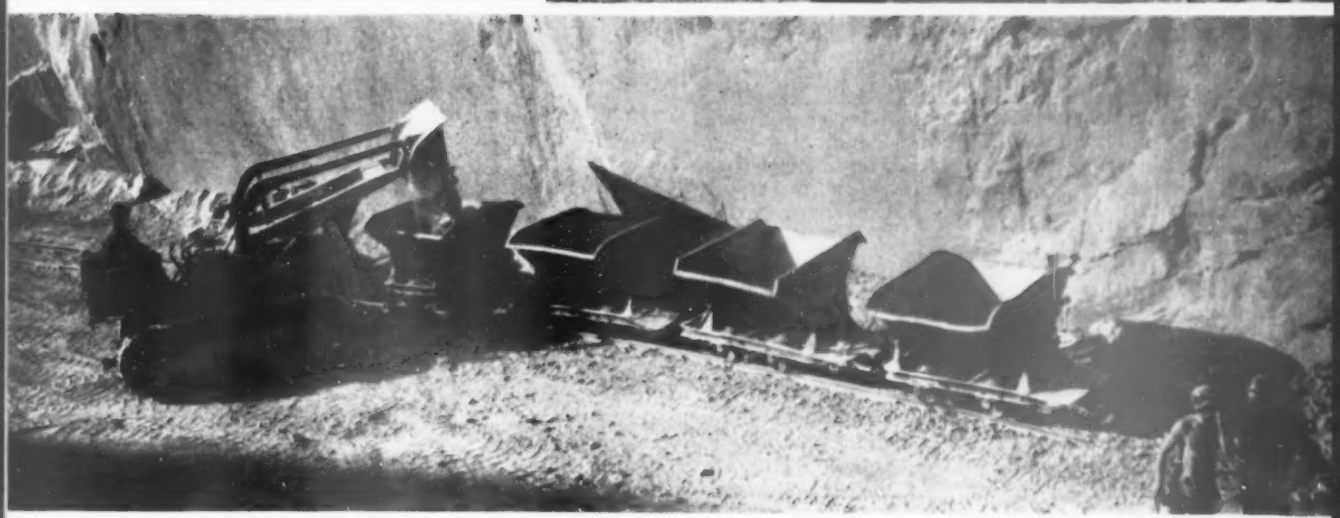
RUGGED FOR ROCK



THERE'S a lot of dusty, equipment-busting rock around a pit or quarry. The Caterpillar HT4 Shovel is built to produce in conditions like these, and to *keep on producing* for thousands of hours without tinkering, coddling or down time.

Carefully sealed hydraulic system and engine keep oil *in* and dirt *out*. Effective air, fuel and oil filters protect the rugged Cat* Diesel Engine from harmful abrasive dust. Engine, tractor and shovel are *matched*, with extra strength where it's needed. It all adds up to a machine that's built to stay on the job and out of the shop.

The HT4 Shovel shown here digs rock and loads and hauls buggies in a quarry at Kananaskis, Alberta, for Loder's Lime Co., Ltd. When both of the plant's kilns are working, this Cat Shovel handles 35 buggies a day. Plant capacity is 70 tons of lime per eight hours. The versatile HT4 can also bulldoze, clean up and do light stripping. It has excellent operator visibility, and is compact and maneuverable for work in tight places.

T. A. Barton, superintendent, says, "Our Cat HT4 Shovel is just the ticket for this work. It gives us no trouble, and never hesitates to start in any weather." Its Caterpillar fuel system and Diesel Engine are *foul-free* all through the power range—idling, lugging, or full throttle. And this on low-cost No. 2 furnace oil! Mr. Barton reports a fuel saving of 30% over his former tractor!

Your Caterpillar Dealer—who backs his sales with fast service and genuine factory parts—will gladly demonstrate, on your own job, the shovel that will do most work for you at lowest cost. Call him now.

Caterpillar Tractor Co., Peoria, Illinois.

CATERPILLAR*

*Both Cat and Caterpillar are registered trademarks—®

NAME THE DATE... YOUR DEALER WILL DEMONSTRATE

SPEED where it saves you most

Here a Bucyrus-Erie drill pounds out hole in a rock pit. Derrick head shock absorber protects machinery from vibration — reduces cable wear by keeping shock loads down. A Bucyrus-Erie "first" the rubber shock absorber is the most successful yet devised.

Bucyrus-Erie blast hole drills have a nation-wide record for ramming holes down fast—and cheap. A brief rundown shows why—

Big 5⅝ to 12-in. holes—quick— The right balance of tool travel distance, tool weight, and blows per minute — combined with an unmatched rock shattering snap at the impact point — put these rigs "holes ahead" in penetration speed.

Quick moves — Long, sure-footed crawlers mean fast, easy rolling over rough ground — positive traction up 30 percent grades.

Rapid set-ups — Hydraulic leveling jacks (standard on 50-T; optional on 29-T) eliminate elaborate ground preparations, blocking and cribbing. Built-in stabilizing jacks (on the 22-T, 27-T and 29-T machines) provide time-saving 3-point setups even under adverse ground conditions.

Close-grouped controls — Easy handling levers are positioned close together for convenient reach. A driller can run this rig at top speed for long periods without slow down. Built-in tool wrenches (on all except 22-T) safely speed tool changing.

For fast, profitable operation standardize on big hole, fast hole Bucyrus-Erie drills. Four models—5⅝ to 12-in. hole capacities.

5B53

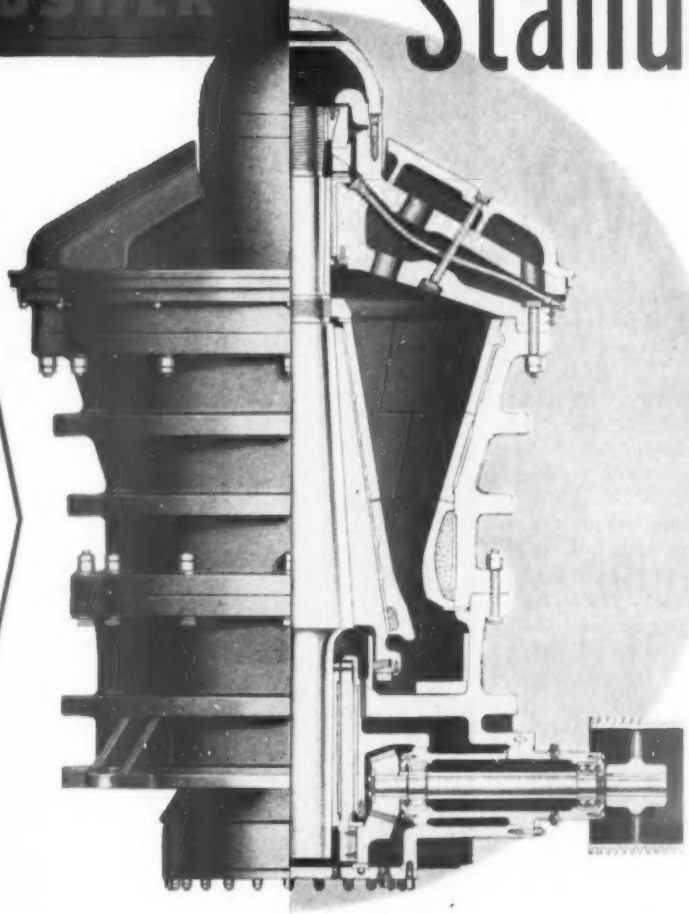
BUCYRUS-ERIE COMPANY

South Milwaukee, Wisconsin

Setting

New Crusher Standards

SUPERIOR
Primary & Secondary
CRUSHER



Improved lubrication throughout, including spider.

Sturdy all-steel construction . . . with heavy external ribbing.

Greater operating flexibility than any comparable crusher. Eccentric setting and speed can be varied to suit your capacity requirements.

More effective dust seal.

Vertical adjustment compensates for wear and maintains uniformity of product by means of adjustable spider suspension or *Hydroset* control. This hydraulic control permits quick product size setting and makes it easy to clear crushing chamber after shutdown.

Easy-to-replace, long life bearings.

Free-fall discharge.

THE *SUPERIOR* CRUSHER — with all these important features — requires fewer manhours to maintain . . . results in less shutdown time . . . less in the way of maintenance. And, whether on primary or secondary crushing, it will produce these savings for years to come. The A-C representative in your area will give you complete, detailed information. Call him, or write: Allis-Chalmers, Milwaukee 1, Wisconsin. A-3648

Superior and *Hydroset* are Allis-Chalmers trademarks.

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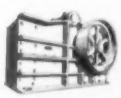
A-C ALLIS-CHALMERS

Sales Offices in Principal Cities in the U. S. A. Distributors Throughout the World.


Hammermills

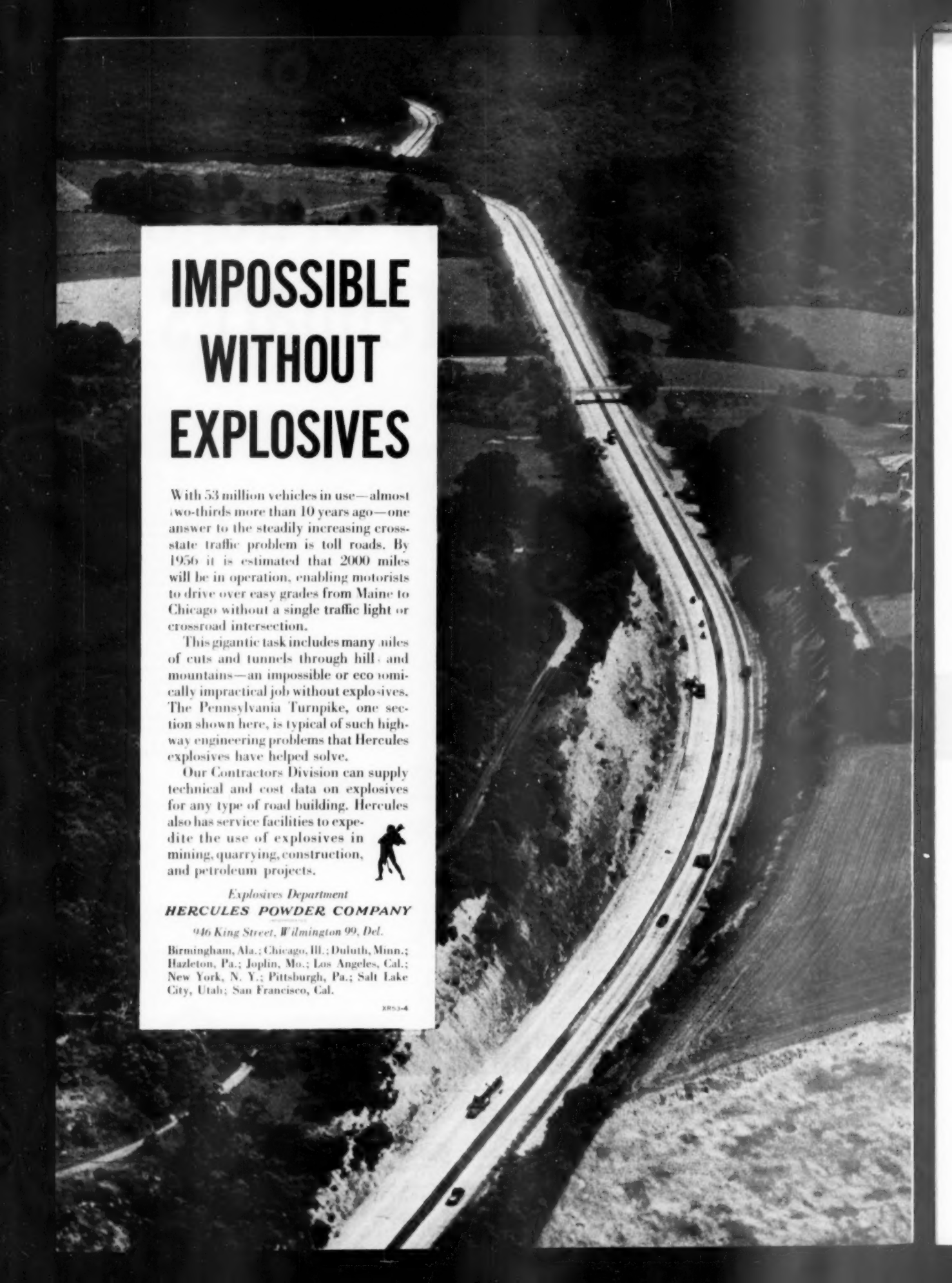

Jaw Crushers


Gyratory Crushers


Grinding Mills


Vibrating Screens


Kilns, Coolers, Dryers



IMPOSSIBLE WITHOUT EXPLOSIVES

With 53 million vehicles in use—almost two-thirds more than 10 years ago—one answer to the steadily increasing cross-state traffic problem is toll roads. By 1956 it is estimated that 2000 miles will be in operation, enabling motorists to drive over easy grades from Maine to Chicago without a single traffic light or crossroad intersection.

This gigantic task includes many miles of cuts and tunnels through hills and mountains—an impossible or economically impractical job without explosives. The Pennsylvania Turnpike, one section shown here, is typical of such highway engineering problems that Hercules explosives have helped solve.

Our Contractors Division can supply technical and cost data on explosives for any type of road building. Hercules also has service facilities to expedite the use of explosives in mining, quarrying, construction, and petroleum projects.

Explosives Department

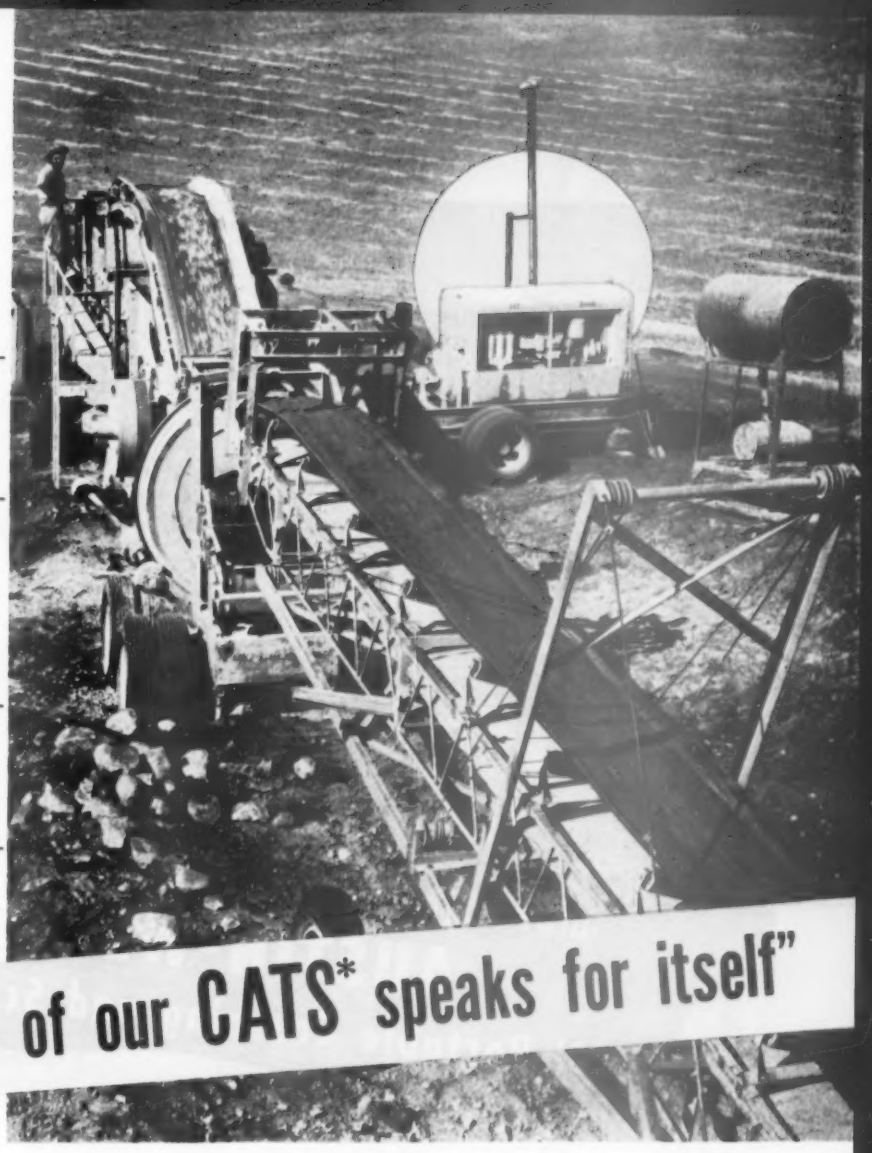
HERCULES POWDER COMPANY

946 King Street, Wilmington 99, Del.

Birmingham, Ala.; Chicago, Ill.; Duluth, Minn.; Hazleton, Pa.; Joplin, Mo.; Los Angeles, Cal.; New York, N. Y.; Pittsburgh, Pa.; Salt Lake City, Utah; San Francisco, Cal.

XR53-4

42 YARDS PER GALLON... NO DOWN TIME...



"The performance of our CATS* speaks for itself"

Under dusty, difficult conditions, this Caterpillar D13000 Diesel Engine powers a Cedarapids portable crusher for the Steve R. Oberg Construction Co. of Sioux Falls, South Dakota. The plant—36" jaw crusher, roll crusher, and conveyors—averages 1,850 yards of ¾" aggregate per 11-hour day. Its rugged Cat Engine has run for two years with no down time.

The Caterpillar Diesel produces 12 yards of aggregate for every gallon of fuel! It can deliver a full 150 HP, or idle *without fouling*, on low-cost No. 2 furnace oil. Result: a three-way saving. Cat Engines cost less to maintain, use cheaper fuel and burn less of it.

A mere three ounces of dust can ruin the finest engine in less than 1,000 hours! Efficient seals and filters protect Caterpillar Engines by keeping oil *in* and dirt *out*. They stop harmful abrasive particles.

Oberg Construction Co. has, in addition to its D13000, a Caterpillar D8 Tractor and two No. 12 Motor Graders on tough and dusty work. Here is what E. G. Oberg says: "All our Caterpillar products have given very satisfactory and economical service. We never have any down time with them. THE PERFORMANCE OF OUR CATS SPEAKS FOR ITSELF."

Leading manufacturers can supply Caterpillar power in their equipment. Insist on Caterpillar Diesels when you order new machinery, or repower your old equipment. Your Caterpillar Dealer will show you the Diesel that is *right* for your needs. You can rely on him to provide fast, dependable service, day or night.

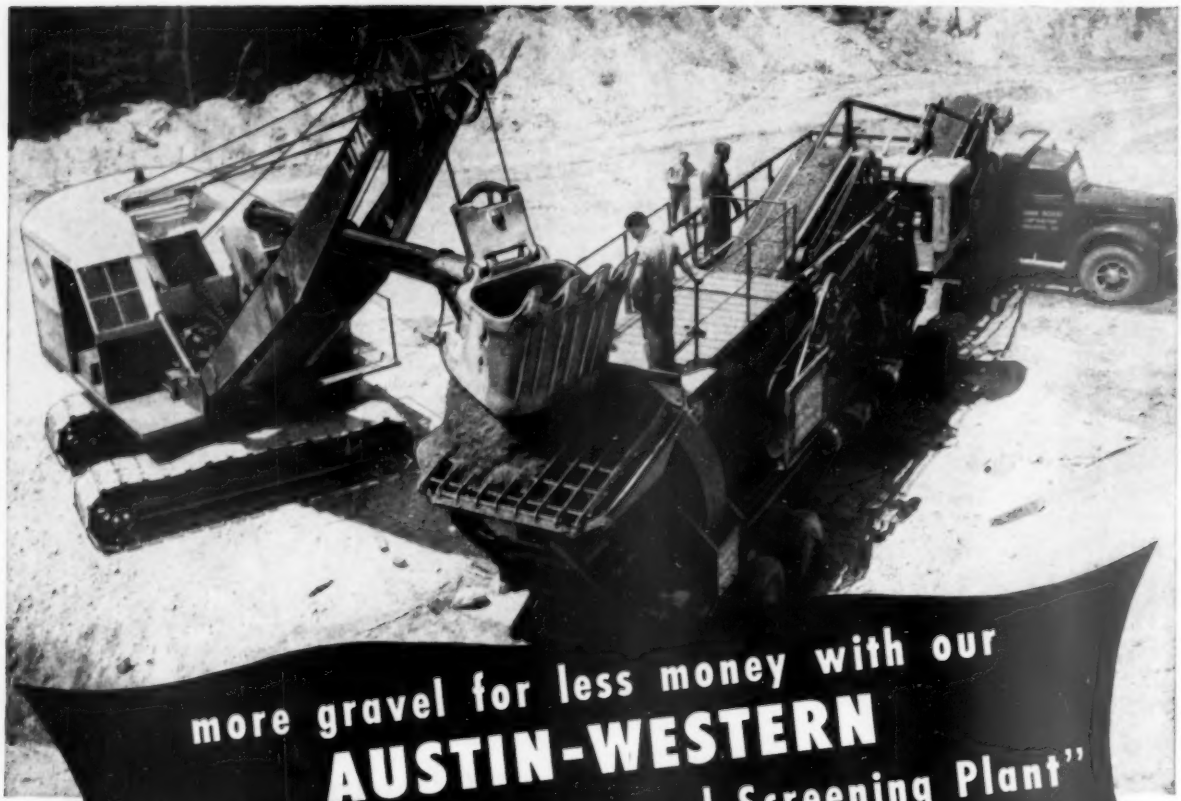
Caterpillar Tractor Co., Peoria, Illinois.

CATERPILLAR*

*Both Cat and Caterpillar are registered trademarks — ®

WE'VE MADE CLAIMS... NOW MAKE US PROVE THEM

"WHEN REBUILDING THE ROOSEVELT TRAIL WE GOT



more gravel for less money with our AUSTIN-WESTERN '201' Portable Crushing and Screening Plant"

...says contractor Frank Rossi of Gardiner, Maine

"Thanks to our Austin-Western '201' crusher we made our own surfacing material for this new highway . . . cutting time and costs by crushing and screening gravel right on the job."

Such reports are not surprising, because this Austin-Western '201' portable crushing and screening plant is really tops. It excells in high production and low operating cost, because of these advantages

Easily portable with high output capacity. Fed by either shovel-loading hopper or feed conveyor. Extra-large screening capacity. Shaft and V-belt drives for all principal units. Anti-friction bearings. Large, oversize conveyors. Simplified design and fewer moving parts for low cost maintenance.

There are Austin-Western crushing plants for any requirement you might have . . . small portable units with single crusher and screen, multiple portable units, or stationary crushing and washing plants. We have just the plant to fit your requirements . . . each basically designed and engineered to give you maximum production at minimum cost.

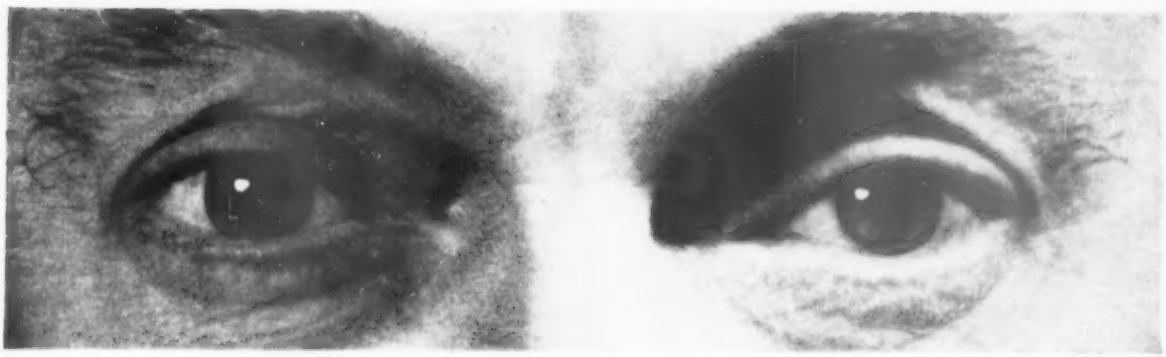
Note: Austin-Western crushers are now being engineered and manufactured in Lima, Ohio enabling us to maintain steady, top-quality production of crushers.

Austin-Western
CRUSHING, SCREENING and WASHING EQUIPMENT

BALDWIN LIMA HAMILTON BLH
Construction Equipment Division

BALDWIN-LIMA-HAMILTON CORPORATION
Construction Equipment Division
LIMA, OHIO, U.S.A.

Want Proof?



then trust your own eyes!

And you will know that Bemis color printing of brands on multiwall paper bags is bright, crisp, color-true . . . the kind that will boost the selling power of *your* brand.

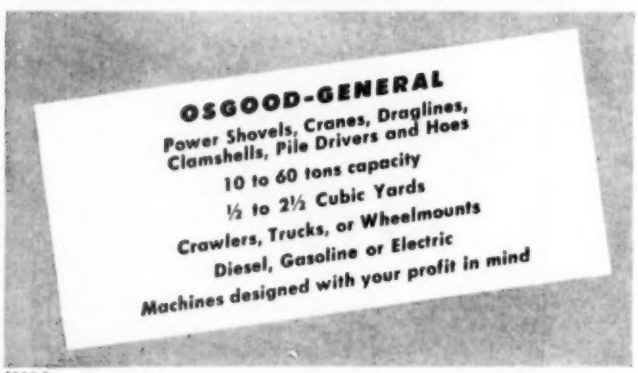
Ask your Bemis Man to show you typical Bemis multiwall printing. Trust your own eyes.

Bemis

General Offices—St. Louis 2, Mo.
Sales Offices in Principal Cities

Widen your profit margin!

OSGOOD ROCK SHOVELS with Torque Converters load more rock...in less time...with less wear



5308-R

Reports from the quarries reveal that OSGOOD Shovels with Torque Converters are setting new production records because of faster loading cycles and smoother operation that drastically reduces wear and maintenance. Operators especially like the fact that these OSGOODS cushion the shocks and will do anything in the book—even "pick-toe," for instance—a maneuver that is practically impossible with many other machines. For detailed information, consult the nearest OSGOOD-GENERAL Distributor.

MEMBER PCSA

OSGOOD O-G GENERAL

MARION, OHIO

OVER 100 YEARS OF ENGINEERING PROGRESS

LONGER SERVICE-LOWER COSTS FOR YOUR WIRE ROPES!

BERCO'S "GUIDE TO SELECTING WIRE ROPE" WILL HELP YOU SPECIFY THE MOST ECONOMICAL ROPE FOR EVERY NEED

For every job there is one particular wire rope that will do the work better – last longer – cost less than any other. That rope carries the right factor of safety, but no more – it offers the right amount of resistance to bending, abrasion, crushing, impact, heat, corrosion.

All these conditions can be met only when the correct grade of wire, the proper rope diameter, the most suitable construction, lay and core are specified for the particular job involved. When you specify these details correctly you will have a wire rope that will give you the best possible service with less idle equipment time during repairs or replacements and lower overall labor costs.

Berco's "Guide to Selecting Wire Rope" will enable you to specify the correct details for every job. It is a concise outline in words and drawings of the most critical points in rope specification. With its help you can make substantial savings in your wire rope costs – get longer and better service.

Return the coupon *today.*

Wire Rope

CUT OFF ALONG THIS LINE

Bergen Wire Rope Company
16 Gregg Street
Lodi, New Jersey

BERCO WIRE ROPE

Gentlemen:

Kindly send me a copy of your brochure "Guide to Selecting Wire Rope."

Company _____

Address _____

_____

City _____ State _____

Signed by _____

Position _____

BERGEN WIRE ROPE COMPANY

on the record...

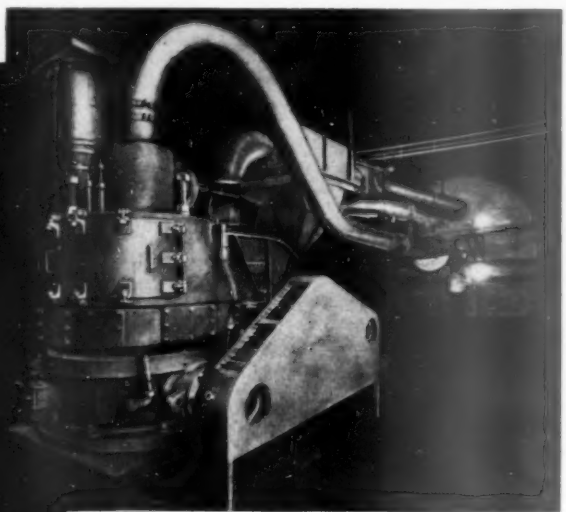
SUSTAINED HIGH PRODUCTION

Here are five primary, factual reasons why B&W Type E Pulverizers are so widely used for direct-firing of rotary kilns . . . have established outstanding records of uniformly high performance in extended continuous service, reflected in maximum production . . . have consistently delivered full rated capacity year after year.

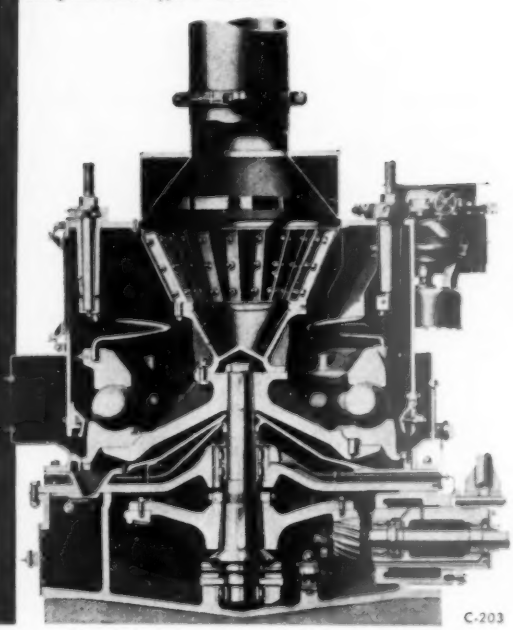
1. Grinding zone has no bearings or parts to be lubricated.
2. No internal adjustments are required.
3. Grinding elements are made of wear-resistant, long life metals, with grinding balls held to close spherical tolerances.
4. Fully-enclosed reduction gear drive, with anti-friction bearings, has integral pump for automatic pressure lubrication.
5. Automatically rejects tramp iron and pyrites without damage to grinding elements or interruption of service.

Extensive, continuing B&W research findings plus the experience accumulated over many years of manufacture and application, are incorporated in the design and rugged construction of the B&W Type E Pulverizer . . . assure that it more than meets every requirement for efficient and economical firing in modern kiln-operating practice. The Babcock & Wilcox Company, Boiler Div., Process Equipment Dept., 161 East 42nd St., New York 17, N. Y.

BABCOCK & WILCOX



The ultimate in Kiln firing is obtained with a B&W Direct-Firing System using the B&W Type E Pulverizer.



C-203

Photo Courtesy Mixermobile Manufacturers, Portland, Oregon

180 horsepowered Scoopmobile loads 4319 yards of wet sand in 31 hours!

No stranger to hard work, this loader. Each time it bends down, a hydraulically operated loading bucket picks up, carries and loads as much as two cubic yards of dirt, rock or sand. Four-wheel planetary gear drive and four-wheel power steering are combined for plenty of power, amazing speed and maneuverability. Five-speed transmission enables top performance under any conditions of terrain.

Like others, this manufacturer powers with Chrysler because he *knows* every Chrysler Engine is engineered for long-lived, top-profit performance. He selected the husky Model 20 Chrysler V-8 Industrial Engine. Result: *more* work in *less* time.

Chrysler can equip its 180 horsepower Model 20, or any of its Industrial Engines, to meet special requirements. For example, Chrysler can supply engines with propane or natural-gas burning carburetor, gyrol Fluid Coupling or torque converter.

Chrysler Industrial Power is not expensive. Production-line methods adapted to specialized engine building provide a custom-built engine at mass-production prices. See a Chrysler Industrial Engine Dealer or write: ***Department 139, Industrial Engine Division, Chrysler Corporation, Trenton, Michigan.***

CHRYSLER
Industrial Engines

HORSEPOWER WITH A PEDIGREE

Now! A new "break" for the driver

. . . is a "break" for your delivery costs! The world's most comfortable truck cab cuts driver fatigue!

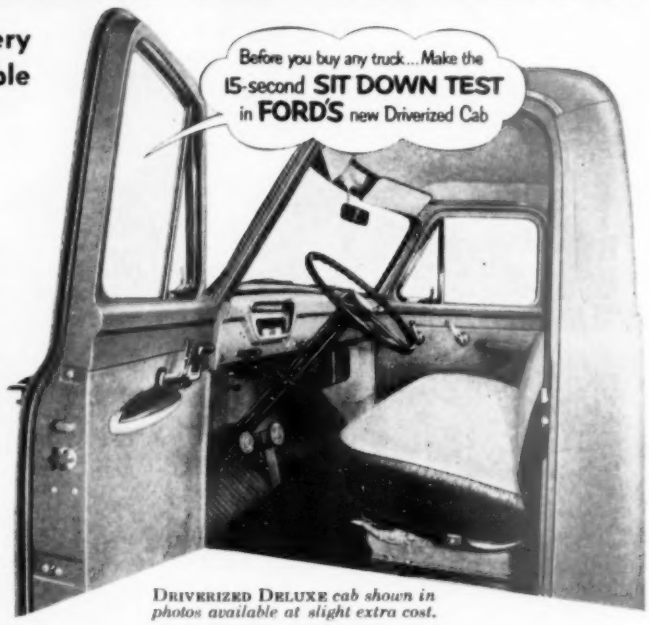
Keeping the driver happy by reducing driver fatigue is not the only virtue of the new Ford Truck DRIVERIZED CAB.

Easier driving, for example, means safer driving! Easier driving means greater efficiency in terms of more trips, more stops, more deliveries per day—which means a more profitable operation.

The new Ford Truck DRIVERIZED CAB is just one of many new *time-saving* features that help *get jobs done fast!*

For sustained speed travel, Ford provides new LOW-FRICTION power in V-8 or Six. For faster, easier handling, Ford provides Synchro-Silent transmissions in every model—and new "short-turn" front axles.

Both Standard and Deluxe DRIVERIZED CABS offer all the features mentioned on this page. See your Ford Dealer for full details.



DRIVERIZED DELUXE *cab shown in photos available at slight extra cost.*

SWING *open the new, wider doors!* Door handles are the easy-operating push-button type . . . like you get in quality cars. Door latches are new rotor-type.

HOIST *your size 12's into the cab!* Plenty of room between the seat and door pillar. No need to do a toe dance getting into or out of a Ford "DRIVERIZED CAB!"

SLIDE *into the wide, comfortable seat.* Bounce on it to test the super-cushioning action of Ford's exclusive *seat shock snubber* and new non-sag springs.

SWEEP *your eyes across the new one-piece windshield.* With picture-window visibility like this you can really navigate. Safer driving, of course! Less eye-strain!

GLANCE *back through the 4-ft. wide rear window.* Heads right or left, you can see the space you're backing into. Why pay extra for rear quarter windows?

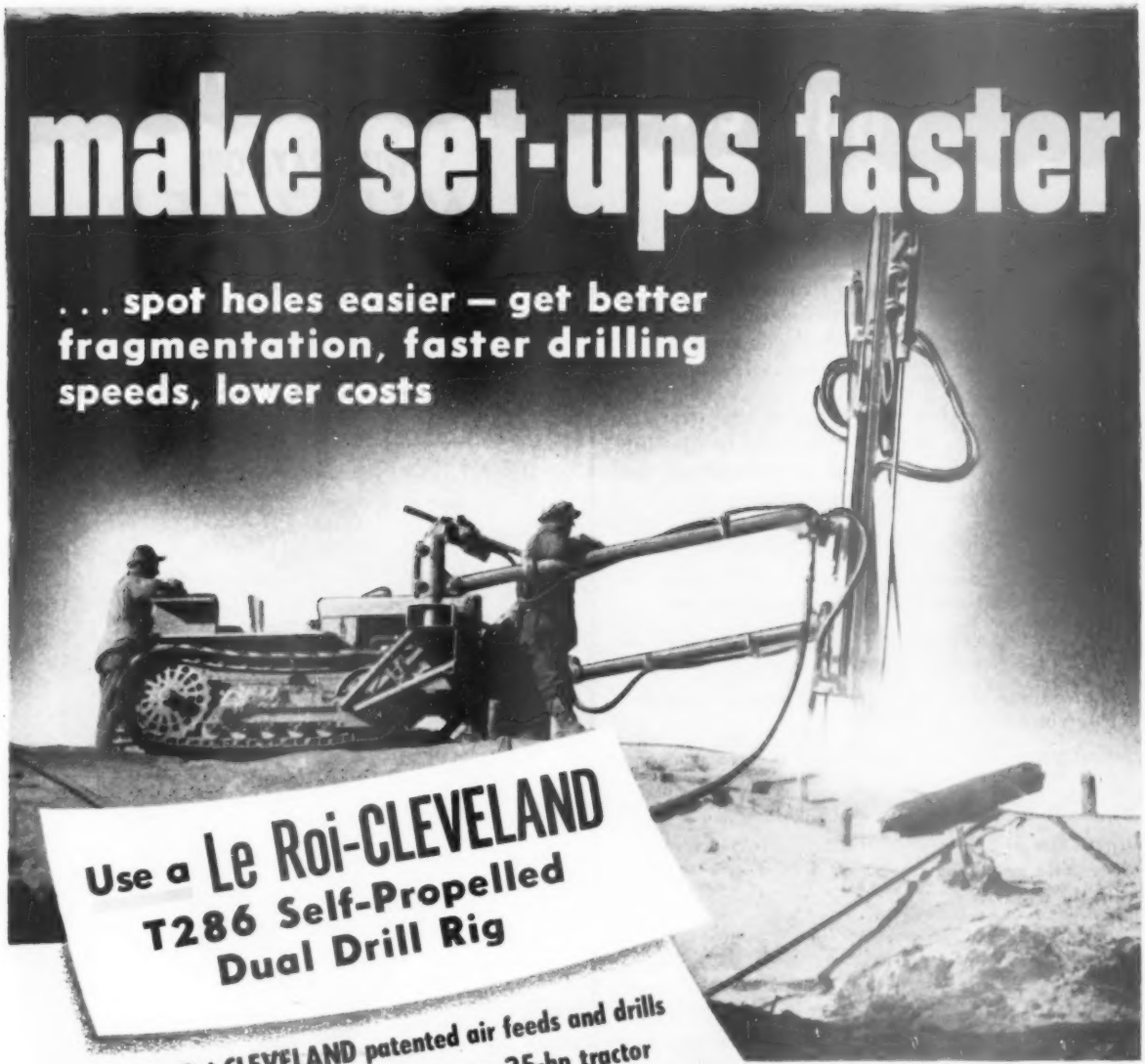
STRETCH *your arms into big cab roominess.* With more hip-room than any of the 5 other leading makes, FORD DRIVERIZED CABS banish that "squeezed-in" feeling.

New F-900 BIG JOB has a 27,000-lb. G.V.W. rating for extra heavy hauling work. LOW-FRICTION 155-h.p. Cargo King V-8 offers high sustained torque to give more performance flexibility for your heaviest loads.

FORD
ECONOMY
TRUCKS
SAVE TIME! SAVE MONEY!
LAST LONGER!

make set-ups faster

. . . spot holes easier — get better fragmentation, faster drilling speeds, lower costs



Use a Le Roi-CLEVELAND T286 Self-Propelled Dual Drill Rig

It's 2 Le Roi-CLEVELAND patented air feeds and drills with air-motor booms mounted on a 25-hp tractor

3 speeds forward . . . 1 speed reverse

ONE man *drives* the Le Roi-CLEVELAND T286 places you couldn't get to before with a wagon drill. And he tows the compressor right along. The T286 drills and cleans holes as deep as 30' — in any direction — at any angle — with less air. All this means faster set-ups, better hole spacing, greater footage, better fragmentation, lower costs. Have your Le Roi distributor show you. Write for Bulletin RD-21.

One Le Roi Airmaster 600 cfm Compressor provides all the low-cost air you need to operate the T286 Dual Drill Rig, when it is equipped with Le Roi-CLEVELAND 4"-bore drifters. A smaller compressor is sufficient, when the T286 is equipped with the 45-lb. H10 or 80-lb. H25 ($3\frac{1}{8}$"-bore) sinker drills or $3\frac{1}{2}$"-bore D25 drifter.

C-144

LE ROI COMPANY

A Subsidiary of Westinghouse Air Brake Co.

CLEVELAND ROCK DRILL DIVISION

12500 Berea Road, Cleveland 11, Ohio

Plants: Milwaukee, Cleveland and Greenwich, O

IMPROVE YOUR CLASSIFYING OPERATIONS

WITH RAYMOND WHIZZER SEPARATION

THE Whizzer principle of classification . . . a special feature of the Raymond Mechanical Air Separator . . . gives such superior results in closed circuit grinding operations that Raymond installations are typical of modern-equipped plants for making finely powdered products.

The *whizzer action* concentrates the oversize along the surface of the inner cone, facilitating its discharge. The resultant advantages of the Whizzer Mechanical Air Separator are:

- Closer separation of the fines and cleaner tailings
- Fineness adjustable externally for production of standard and high early strength cements
- Greatly increased mill output as compared to open circuit operation
- Maximum recovery of finished material and uniformity of product
- Overall economy in power, maintenance and operating costs

For a better return on your separating equipment, specify Raymond Whizzer Air Separators. Available in a full range of sizes with single or double whizzer.

DOUBLE WHIZZER TYPE MECHANICAL AIR SEPARATOR
Sizes: 4'0" to 18'0" Diameter

30-INCH SEPARATOR for small commercial applications and laboratory use

LABORATORY SEPARATOR for running test operations

Write for detailed information today.

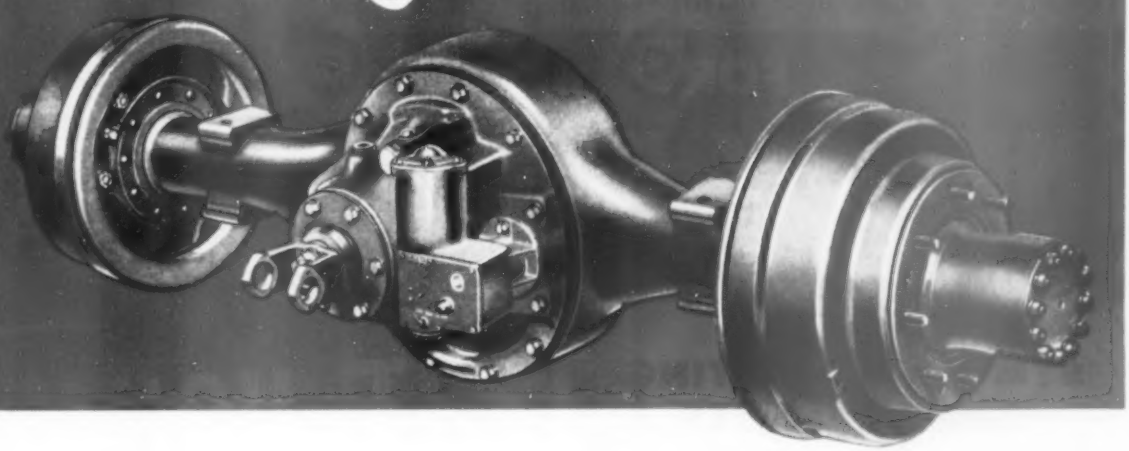
COMBUSTION ENGINEERING, INC.

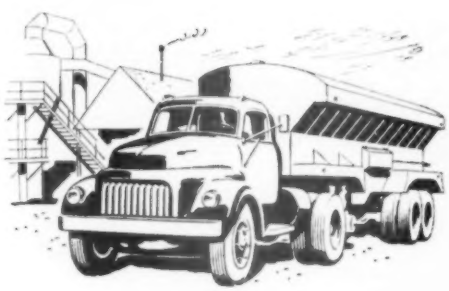
Raymond PULVERIZER DIVISION

1307 North Branch St.
Chicago 22, Illinois

Sales Offices in
Principal Cities

With Eaton 2-Speed Axles, a cost-cutting gear ratio for every road and load





More than a million-and-a-half Eaton 2-Speeds in trucks today!

Eaton 2-Speeds enable drivers to select the right gear ratio for every operating condition—starting out under full load, climbing grades, high-balling, quick shifting in traffic. Engines operate in their most efficient speed range, reducing stress and wear on vital truck parts. Operating and upkeep costs are at a minimum; trucks last longer, are worth more when traded in. Ask your dealer to explain how Eaton 2-Speed Axles give trucks power when needed, speed when wanted.

EATON

AXLE DIVISION

MANUFACTURING COMPANY

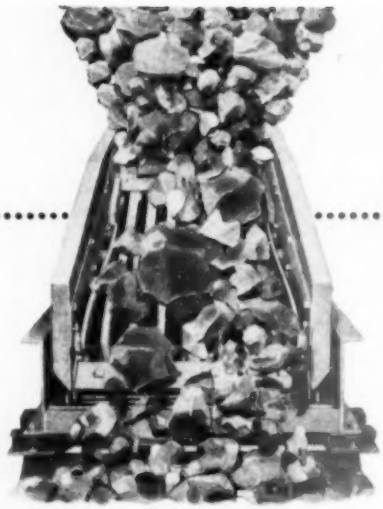
CLEVELAND, OHIO

PRODUCTS: Sodium Cooled, Poppet, and Free Valves • Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Jet Engine Parts • Rotor Pumps • Motor Truck Axles • Permanent Mold Gray Iron Castings • Heater Defroster Units • Snap Rings Springtites • Spring Washers • Cold Drawn Steel • Stampings • Leaf and Coil Springs • Dynamatic Drives, Brakes, Dynamometers

SYMONS VIBRATING BAR GRIZZLIES

. . . up to 500 tons per hour
handling feeds ranging to power shovel size

The SYMONS Type-K vibrating manganese Bar Grizzly is recommended for large tonnage *Scalping* of ore, rock or gravel. The powerful vibrating action of the Bar Grizzly makes it particularly effective for wet, sticky or gummy materials. The sloping, curved bars of the Symons Bar Grizzly tend to cascade the material as it passes over the screening surface. The tumbling action effectively assists in separating the undersize. Will handle feed sizes up to 30" and larger.



For full details about the SYMONS BAR GRIZZLY, send for BULLETIN 121A.

FOR HEAVY DUTY SCALPING SERVICE

For full details about the SYMONS ROD GRIZZLY, send for BULLETIN 207.

SYMONS VIBRATING ROD GRIZZLIES

. . . up to 500 tons per hour
for feeds up to 10" — 12"

The SYMONS Type-K—RG vibrating Rod Grizzly is built for heavy duty scalping service in large tonnage operations . . . bridging the gap between primary breaking and the secondary crushing and screening operations. It can readily handle dry, wet, sticky or gummy ores and rock. Some of the important features include:

Abrasion resistant heavy spring steel rod screening surface; Long lasting, low cost rods are easily adjusted or replaced; Effective, vigorous vibration provides thorough scalping; Amplitude of vibration can be quickly and easily changed to meet various operating conditions. Ideally suited for service following most sizes of primary crushers and scalping operations requiring relatively coarse separations in the range between 1" to 4".

S253

SYMONS . . A Registered Nordberg Trademark Known Throughout the World

NORDBERG MFG. CO., Milwaukee, Wisconsin

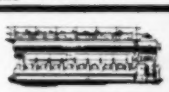
SYMONS GYRATORY CRUSHERS

SYMONS CONE CRUSHERS

MINE HOISTS

SYMONS "V" SCREENS

GRINDING MILLS



DIESEL ENGINES

NORDBERG

MACHINERY FOR PROCESSING ORES and INDUSTRIAL MINERALS

NEW YORK • SAN FRANCISCO • DULUTH • WASHINGTON • TORONTO
MEXICO, D.F. • LONDON • PARIS • JOHANNESBURG

TOUGH TEST for a scraper

Stripping dry, very hard clay overburden is a severe test of a scraper. When it can haul 1,000 yards in an eight-hour day with a 2,400-foot round trip, it has passed the test with flying colors. That's the record of this Caterpillar No. 80 Scraper and D8 Tractor, stripping overburden from red firebrick clay near Ione, Calif. They are owned by John Pedro of Stockton.

Mr. Pedro has standardized on Caterpillar equipment, with five D8 Tractors, three No. 80 Scrapers, a Motor Grader, Ripper and two stationary Cat* Diesel Engines. "I've owned Caterpillar equipment for about 18 years," he says. "I'm always able to get parts and service, and have had very little down time. If I were to buy more machines tomorrow, I'd make them Caterpillar-built units."

Mr. Pedro reports that his No. 80 Scraper is push-loaded full of hard clay in about 45 seconds, and unloads in about 10! The burly No. 80 hauls a heaped load of 20 yards. Being cable operated, it loads smoothly, and can pump "dead" material. And it unloads quickly and evenly with positive, fast-responding ejection.

Like all Cat equipment, the No. 80 is built to stay on the job and out of the repair shop. Good design, rugged construction and high tensile steels give it the ability to earn its keep for years to come.

Your Caterpillar Dealer will gladly demonstrate, *on the job*, the Cat Scraper that fits *your* needs. He stands back of the machine he sells with factory-supervised service and a big parts stock. Call him today.

Caterpillar Tractor Co., Peoria, Illinois.

CATERPILLAR

*Both Cat and Caterpillar are registered trademarks—®

NAME THE DATE... YOUR DEALER WILL DEMONSTRATE

CALL ON STANDARD

A ten-foot diameter *Standard* kiln is pictured above, ready to be shipped to its Louisiana destination. Lower photo shows kiln shell mounted on flat cars. Another car carries the enclosing furnace, trunnions and running gear.

Although by no means the largest kiln to be completed by *Standard*, it is a good example of our ability to design and build rotary processing equipment of any size—LARGE or SMALL.

In this, our 50th Anniversary Year, we take pride in the fact that for precision engineering and fabrication of heavy duty machinery, the call is so often for *Standard*.

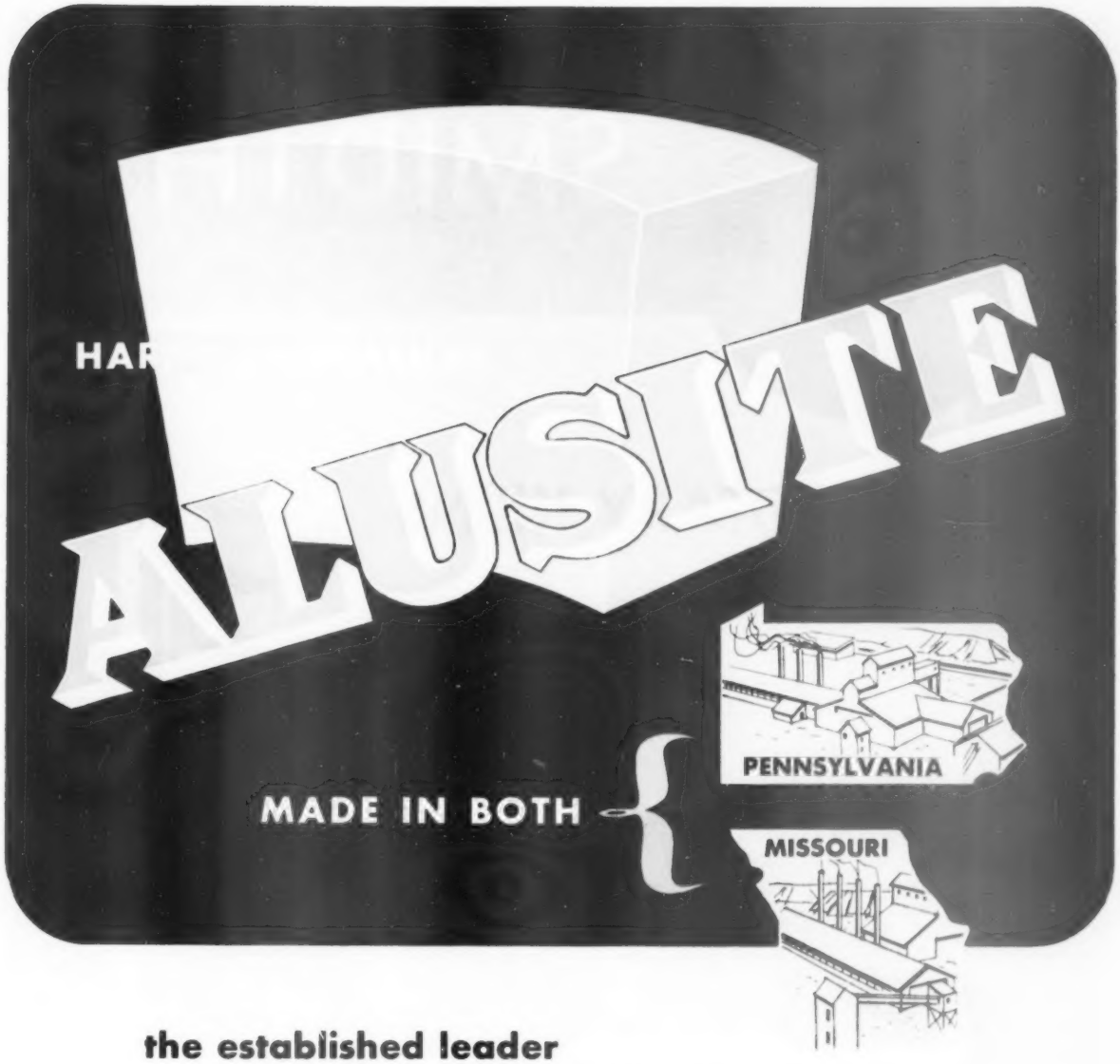
Rotary KILNS
COOLERS
CALCINERS
DRYERS
ANY size
ANYwhere

STANDARD

WRITE FOR COMPLETE DESCRIPTIVE LITERATURE

STANDARD STEEL CORPORATION

5036 Boyle Avenue, Los Angeles 58 ● 7 East 42nd Street, New York 36



the established leader in the 70% alumina refractory class

The superior physical properties and chemical composition of ALUSITE long ago established its leadership in the 70% Alumina Refractory Class.

Outstanding service records made by ALUSITE in rotary kilns are attributable to its low porosity, high strength, volume stability and excellent spalling and flux resistance.

Some highly economical applications of ALUSITE are the following:

- **High temperature zones of cement kilns**
- **Transition zones of basic-brick-lined cement, magnesite and dolomite kilns**
- **Calcining zones of lime, lime-sludge, magnesite and dolomite kilns**

Included in Harbison-Walker products are refractories for every rotary kiln plant requirement.

Harbison-Walker Refractories Company

AND SUBSIDIARIES

WORLD'S LARGEST PRODUCER OF REFRACTORIES

General Offices . . . . . Pittsburgh 22, Pennsylvania

"WE HEAR..."

September, 1953

Construction contract awards in the 37 states east of the Rockies, for the first seven months of 1953, totaled $9,701,180,000, which was 5 percent above the comparable 1952 figure, according to an F. W. Dodge Corp. report. The 7-month totals by classification were: Non-residential, $3,716,424,000, or 14 percent above the same period of 1952; residential, $3,911,903,000, or 1 percent less; and heavy engineering, $2,072,853,000, up 1 percent. Total awards for the month of July took a sudden jump over the lagging June awards to reach a total of $1,793,342,000, the highest of any month this year to date. Contributing to the July rise were the highest monthly awards for commercial building and for educational and science building ever recorded by Dodge Corp. since it started to compile construction statistics in 1919.

* * * * * * * * * *

Commercial truck drivers were declared the safest and most economical of all drivers at the semi-annual Motor Transportation Awards dinner held recently at San Jose, Calif., and sponsored by the local chapter of the National Safety Council. Among the award winners was Permanente Cement Co. which won safety awards in the long-haul division with a record of only one accident for each 664,017 miles driven; in the pickup and delivery classification with no accidents in 129,600 miles; and in the special achievement division for having the accident-free record in the pickup and delivery classification.

* * * * * * * * * *

According to a recent report in Architectural Forum, American universities last year added 865 new buildings, costing $480,000,000, to their existing facilities, which are still inadequate to meet the post World War II boom in enrollments. To add to the already critical building shortage, a 60 to 100 percent increase in students is estimated for the next ten years. The problem is largely a financial one. Endowments are up in the private colleges, where fund-raising organizations have conducted alumni-soliciting campaigns, but they are still running far below the school building cost index which reportedly has doubled since 1939. Some assistance has come from corporations which are allowed a tax deduction of up to 5 percent for donations to educational institutions.

* * * * * * * * * *

Machinery for a concrete block plant, occupying eight large crates and weighing 16 tons, was recently shipped to Korea by Columbia Machine Works, Vancouver, Wash. The equipment, consigned to Central Mill & Supply Corp., Pusan, Korea, will give Korea its first concrete block plant. According to a representative of Columbia Machine Works, the company expects to ship additional equipment for plants in Seoul and other points in Korea after the Pusan plant is completed.

* * * * * * * * * *

Crushed stone is finding new outlets in Page and Fremont Counties in Iowa. Mailbox turnouts, road approaches and shoulders are being surfaced for the first time for the purpose of aiding motorists (such as mailmen) who use driveways and turnouts to turn around. Shoulders are being surfaced in the non-curbed sections to make driving safer.

* * * * * * * * * *

A conveyor belt with the longest known record of service for an industrial rubber belt has been "retired" after 64 years of continuous use by a Minnesota grain concern, as recently announced by the manufacturer of the belt, New York Belting and Packing Co. It was one of the first cotton duck and rubber belts to be used for industrial hauling. The 24-in. wide belt is to be sent back to the manufacturer to undergo extensive laboratory tests. The belt reportedly still could have had several years of useful service but was replaced when major construction changes were being made at the plant.

WE HEAR

The third and biggest wave of new construction wage agreements this year pushed construction costs to new highs in August, as reported by Engineering News-Record. The construction cost index for August was 612. This represented a 1.3 percent increase over the July figure and a 4.8 percent rise in the past 12 months, compared to a 7.8 percent climb in the previous 12-month period. The building cost index for August was reported as 437, or 0.4 percent above July and 3.5 percent higher than a year ago. In the previous 12-month period the building cost index rose by 5.9 percent.

* * * * * * * * * *

Two rare minerals, scawtite and afwillite, have been discovered in the Crestmore quarry near Riverside, Calif., which has the world's largest natural mineral collection, as recently reported by Science Service. Neither of the newly discovered minerals are considered of any commercial value but both are of interest to geologists because of their rarity and unusual structure. They are said to be formed on rare occasions when hot igneous rock intrudes into limestone and produces new combinations of elements in the limestone. Scawtite is a colorless crystalline calcium carbonate-silicate and has been found in only two other locations in the world, Scwat Hill in Ireland and in Montana. Afwillite also has been found in only two other places-Scwat Hill and the Kimberley region in Africa. The discovery of the two minerals brings the total of minerals known to exist in the Crestmore quarry to more than 130 varieties.

* * * * * * * * * *

Construction awards are being made for Ohio's $326,000,000 bond-financed turnpike. The Turnpike Commission has awarded a $7,522,678 contract for 9½ miles of road in Portage County to R. B. Potashnik of Cape Girardeau, Mo. The bid for the contract, although 11 percent above commission estimates, was still considerably lower than other bids on all four sections of the 241-mile roadway which are running about 43 percent above the estimates.

* * * * * * * * * *

In scanning through plant accident items, we came across an amusing account of how an employe of a brick and pipe company was hit on the head by a load of brick. According to the report, "it just dented his head, fortunately!"

* * * * * * * * * *

Ready-mixed concrete trucks from Tucson Rock and Sand Co., Tucson, Ariz., were recently pressed into service as fire engines in order to save a neighboring house being threatened with destruction by fire. Damage was confined to about $750 in a storage shed about 14 ft. from the house. The fire was believed to have been caused by children setting fire to weeds in a nearby abandoned quarry and brisk winds tossed sparks into dried brush under the eaves of the shed. The fire was discovered by Ed Henry, operator of the Tucson company, who ordered his men to drop their regular work and haul water in the mixer trucks. Five trucks kept up a steady flow of water for more than five hours until the fire was brought under control.

* * * * * * * * * *

Heavy construction awards, nationally, totaled $10,131,572,000 for the first 34 weeks of 1953, as reported by Engineering News-Record. This was a decrease of 7 percent from the $10,949,892,000 construction awards for the corresponding 1952 period. The reason given for the decrease was the $1,200,000,000 contract for the Portsmouth, Ohio, atomic bomb plant, let a year ago. Excluding the Ohio atomic plant and also the awards for the Paducah and Oak Ridge plants let last year, contract volume in 1953 is 14 percent ahead of 1952. Private construction is running 30 percent ahead of 1952, state and municipal awards are up 18 percent, while federal contracts have dropped 72 percent.

* * * * * * * * * *

A local western union recently was sued in district court for $15,000 damages by a sand and gravel firm which the union had been picketing. The suit requested an injunction prohibiting the union from continuing to picket the firm. The company charged that the strike was illegal under the state labor peace act. It said union men were following its concrete mixing trucks to construction jobs and intimidating customer' workers, thus engaging in an illegal secondary boycott. The petition alleged $5000 damage had been done to date by delaying concrete trucks in depositing their loads, thus allowing the concrete to set and impair the equipment. Another $10,000 was sought for loss of business.

THE EDITORS

Progress in Motor Grader Design

Allis-Chalmers new AD-40 shows importance of visibility. Operator can see front wheels — both ends of blade while he works.

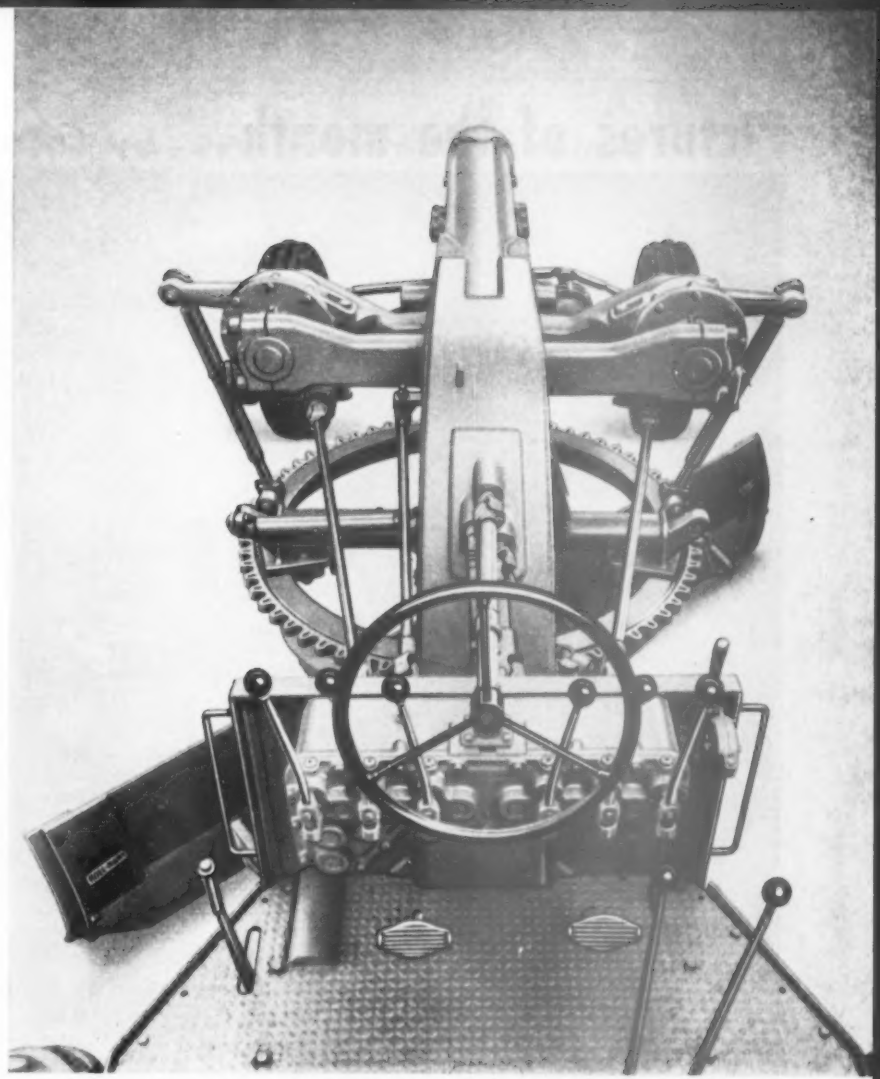
A MOTOR grader operator has to be able to see his work to do a good job. This is of prime importance in building and maintaining haul roads.

Here is how Allis-Chalmers engineers made sure the new AD-40 met these requirements. They carried A-C's single member frame all the way from the front axle to the platform; cut down the size of the lift cases to eliminate blind spots; lowered the control box and eliminated assemblies from the front panel to provide better visibility of the work area directly in front of the operator; tapered the front edges of the platform so that he could see both ends of the moldboard as he works.

There is not only ample leg room for stand-up operation but the steering wheel height is adjustable and the seat rolls forward at a touch for sit-down operation.

Combined with a new kind of power steering, these advanced design features are making Allis-Chalmers AD-40 an increasing favorite with operators and owners alike because it means more work done with less effort. For more facts on the AD-40, it will pay you to see your nearby Allis-Chalmers dealer.

ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.



(above) Here is actual view operator has from platform of Allis-Chalmers AD-40, showing how well he can see both ends of the blade and both front wheels.

(below) The AD-40 has 104 brake horsepower, 23,000 pounds of weight and tandem drive traction, all it needs to do a better job on heavy duty construction . . . a faster job on maintenance.

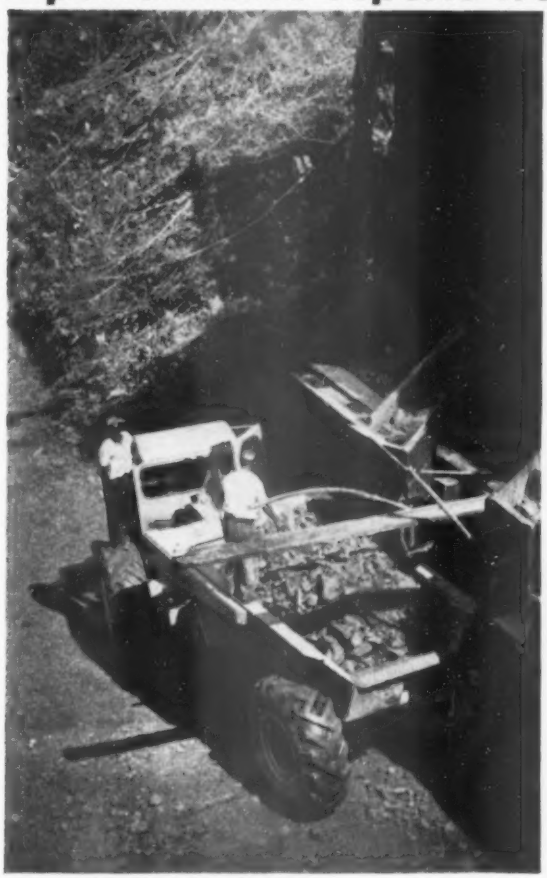
Pictures of the month... *by LeTourneau-Westinghouse*

TURNS IN 26-FOOT-WIDE CUT — Ability to turn in a box cut or on a narrow roadway is an important time-saver in many pits. This picture from Brazil well illustrates the unique turning ability of Tournarockers. Here the 16-ton "C" eliminates a 1000-ft back-in to the shovel by turning non-stop in a 26-ft wide cut. "Tournarockers' short turn radius (10½ ft with bowl raised) saves construction of access roads and turn-arounds," says Giovanni Sala, project mgr for owners Beretta & Novi. Cuts on this railroad relocation range from 50 to 100 ft deep, so turn-arounds would be very expensive. Besides the 2 Tournarockers, Beretta & Novi own 10 Tournapulls. They report, as typical output, 78,000 yds in 100 days for 2 Tournarockers in shovel-loaded sandstone and clay . . . 314,000 yds in 100 days for 6 Tournapulls push-loaded in sandy loam and clay. Hauls for all equipment averaged 4250 ft.

CLEAN OVER-EDGE DUMP — With front-wheel drive, Tournarocker backs safely to edge of bank. Loads fall free and fast. Little or no dump clean-up is required. Says Red Parrot Coal Co Supt F. Mason Morgan, user of unit shown, "Tournarocker works better than any rubber-tired equipment we've used."

COMPACTS COAL — Public Service Electric & Gas Co, Camden, NJ, hauls 208 tons of coal hourly from conveyor to stockpile with Tournatractor-Carryall team. On 760-ft cycles, "C" delivers 16 tons every 4½ min. Rig's big tires effectively compact, seal coal against spontaneous combustion.

...with performance reports from around the world



FLYING GOLD-MINER — To reach isolated mine in center of Nicaragua, this 9-ton Tournarocker was cut apart and flown 110 mi over the jungle. Re-welded at job, it now hauls gold ore and waste to crusher. In typical month, it worked 356 hours, hauled 4698 tons. Hauls averaged 9800 ft, all up-grade, with 9500 ft at 3 to 10%, 300 ft at 12 to 20%.

FIRE-FIGHTER — In Missouri, Tournatractor helps combat stockpile fire by spreading burning coal. Continued use of this machine will greatly reduce possibility of more spontaneous combustion fires. Its big rubber tires compact coal and eliminate air spaces during normal travel across stockpile.

DOUBLE-HEADER — This Tournatractor means business at both ends. Crane boom, designed by Standard Sand & Silica Co, Davenport, Fla, lifts with regular LeTourneau-Westinghouse motor, has 3-ton capacity. Front end mounts standard dozer blade.

50 TONS EVERY 4½ MINUTES — Stripping overburden from two soft coal veins near Clearfield, Pa, this big Model A Tournarocker carries 50 tons of slate, shale and clay per load. Time for complete 400-ft cycles averages only 4½ minutes.

MORE THAN 1 WAY — When not needed for scraper work, J. W. Crowder, Houston, uses his C Tournapulls to haul from a dragline. Here, rig gets heaped load of tightly-compacted gumbo on dam and spillway construction job along the Sabine River in Texas. Unit made 2000-ft cycle in 3½ minutes.

(continued on next page)

Pictures of the month... *by LeTourneau-Westinghouse*

2½ MIN TO LOAD — It isn't often you see a big rig like a D Tournarocker loaded by a front-end loader. But Ft. Hartford Stone Quarry of Olaton, Kentucky teams the two to provide 100% of their limestone . . . and does it profitably! Their 9-ton Tournarocker takes 5 to 6 passes from the 1¼-yd bucket . . . is loaded with shot rock in 2 to 3 minutes. Complete 600-ft cycle to crusher takes 4 minutes "Thoroughly sold on Tournarocker for this work," says A. C. Hall, Company President.

15¢ PER YD — For crusher, A. T. Waltenburg, Jackson County (Oregon) Hwy Supt, needs 500 tons of gravel per 8-hr day. He brought in a 9-ton D Tournarocker to replace 2 trucks. The one Tournarocker averages 64 yds hourly to deliver all gravel crusher can handle. "A real money-saver," says Waltenburg. "Moves dirt for under 15¢ a yd." Major saving is on repairs. Tournarockers' big tires absorb shocks. Unit has no frame, sub-frame, springs, spring hangers, hinged axles, hydraulics . . . hence is seldom in shop.

POWERFUL WINCH — Fast electric controls and 67,000 lb line pull make Tournatractor ideal for towing trucks out of mud or skidding equipment. Here, it tows enough Douglas fir for a bungalow (about 7000 bd ft). Owner is Roy Monschke, Fortuna, Calif.

STRIPPING FOR STEEL — To meet a vastly increased demand for limestone from the steel industry, Kelley Island Lime & Transport Co, Cleveland, works 2 C Tournapulls 16 hrs per day stripping limestone at their Marblehead quarries. The 2 units combined remove 418 to 436 bank yds of rocky loam overburden per 50-min hr. Hauling over rough, winding roads and up 1 to 10% grades, Tournapulls complete cycles of 2200 ft in 2¾ minutes.

(Advertisement)

. . with performance reports from around the world

HEAVE-HO — Two ages meet on the Black Sea at Kozlu, Turkey. In the background, natives beach fishing boats just like their ancestors did hundreds of years ago. In the foreground, a modern high-speed Tournatractor lifts the loads from hundreds of aching backs as it levels spoil hauled by eight 22-yd trucks from the Eregli Coal Fields, Turkey's newest coal mine.

DOZES WET CLAY — Almost 1,000,000 yds were filled into Lake Michigan near Milwaukee recently to build a 900 x 900-ft coal dock. "Tournatractor handled output of 7 scrapers," reports Operator L. Derk. "One day, when rigs were on 600-ft haul, I dozed 6,390 yds into the lake. Also helped crawlers through the spread. Even had time to travel uphill to clean the cut."

NO TIRE BREAKAGE — After months of double-shift hauling of Florida pit rock, Maule Industries Inc report no tire troubles on their 18-ton Tournarocker. Its big 21.00 x 25 single tires rolled easily over blasted rock or quarry floor. Smaller 6 and 12 yd trucks, used on same hauls lost time due to blowouts and other tire damage. This was caused mostly by rocks wedging between the duals, or concentration of weight on a single small tire when rolling over rock fragments. Tournarocker and trucks brought shot limestone 1.8 to 2.2 miles from pit to crusher. For complete facts on this and other units shown on these pages, write LeTourneau-Westinghouse Company, Peoria, Illinois.

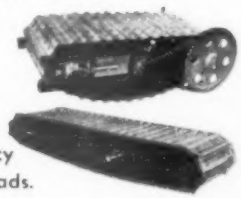
YOU save time, material, money with REX apron feeders!

Uniform, Regulated Flow...that's important when you're concerned with moving bulk materials from bin or hopper to belt conveyor or crusher. With Rex Feeders you're assured a metered, uniform rate of transfer, regardless of variation in size of material handled. Your belt conveyor or crusher will receive a steady flow of material to assure smooth, efficient, low-cost operation.

Here are some questions we are frequently asked concerning Rex® Feeders. The answers tell you why there's no question about it—Rex Feeders are your economical, money-saving choice.

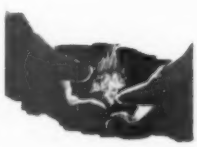
Q. ***In what respects are Rex Apron and Pan Feeders superior to other feeders such as the vibrating type?***

A. Rex Self-Contained Apron and Pan Feeders require only a minimum of mechanical servicing rather than complicated electrical maintenance. Steep inclines are practical. Their efficiency is unaffected by varying loads.

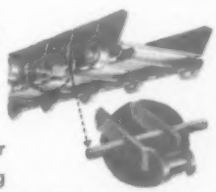


Q. ***What temperature range can be handled successfully with Rex Apron and Pan Feeders?***

A. Existing installations are handling sintered, calcined, briquetted, nodulized and similar hot material fed to them as hot as 1900° F. Chain and carrying rollers are removed from intense heat zone. Localization of intense heat can be controlled.



Q. ***What is the outstanding Rex advantage over other apron and pan feeders?***



A. The Rex Outboard Roller Construction is an outstanding advantage of Rex Feeders. Outboard rollers can be replaced without taking chain apart. Only ¼ as many operations are required as when rollers are between side bars. Exclusive Rex Square Through Rods, seated in square holes in side plates, positively cannot rotate.

Q. ***What types of material can be handled on Rex Apron and Pan Feeders?***

A. Any relatively dry loose bulk material...hot or cold. Some of those most commonly handled are:

- Coal
- Ore (Metallic, Non-metallic, Mineral)
- Clinker
- Sinter
- Limestone
- Sand
- Cement Rock
- Heavy Chemicals

Ask your Rex Field Sales Engineer to give you complete information on how you can save money with Rex Feeders. Call the office nearest you, or write to Chain Belt Company, 4649 W. Greenfield Ave., Milwaukee 1, Wis.

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"Best Wire Rope Service..On 33 Draglines"

Tuffy Draglines

Says Superintendent of a Leading Florida Rock Producing Company*

Dragline drainage ditching jobs, like this one in Michigan, call for extra flexible, extra tough Tuffy Draglines.

Longer Service Life of Tuffy Results in Big Savings On Rock Crushing Jobs

"On our first comparison test, Tuffy Draglines went 26 shifts against 19 shifts for the make we had previously been using. Our second test proved even more conclusive: 19 shifts for Tuffy, 9 shifts for the other make. Now we use Tuffy Drags 100%."

These tests were conducted by a construction company that operates 33 draglines in their plants. By their own tests, they proved that Tuffy's extra flexibility, extra abrasive resistance, and extra toughness helped them cut dragline costs 40%. Discover for yourself how Tuffy Draglines can move more material for longer periods to help you reduce handling costs.

*(name on request)

UNION WIRE ROPE CORP

union Wire Rope corporation

Specialists in Wire Rope and Braided Wire Fabric

Since Switching To

Moving a mountain of sand and gravel laid down by a glacial stream thousands of years ago requires skill *plus* equipment you can count on. You can count on Tuffy Draglines for greater abrasive resistance and reduced handling costs.

Other Specially Designed Tuffy's For Special Uses

Tuffy SCRAPER ROPE

Tuffy is tailored to take • Greater drum crushing abuse • Sharper bends over smaller sheaves • Angle pulls through swivel mounted sheaves. • Crawling on flanges of guide rolls and edges of sheave housing • Multiplied impact shock of load on slack lines.

Tuffy DOZER ROPE

No need to throw away 40' to 50' of good rope when 10' or so is crushed or cut. With a reel of Tuffy Dozer Rope, mounted on your dozer, you feed only enough through the wedge socket to replace *only* the damaged part . . . get up to 300% increased service! And, you can make the cut and have your dozer back at work in less than *half* the usual time!

Tuffy SLINGS

9 part machine-braided wire fabric construction fights off knots and kinks, stands up longer than ordinary wire rope. Proof-tested to twice safe working load.

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☐ Tuffy Dozer ☐ Tuffy Slings

Firm Name_____

By_____ Title_____

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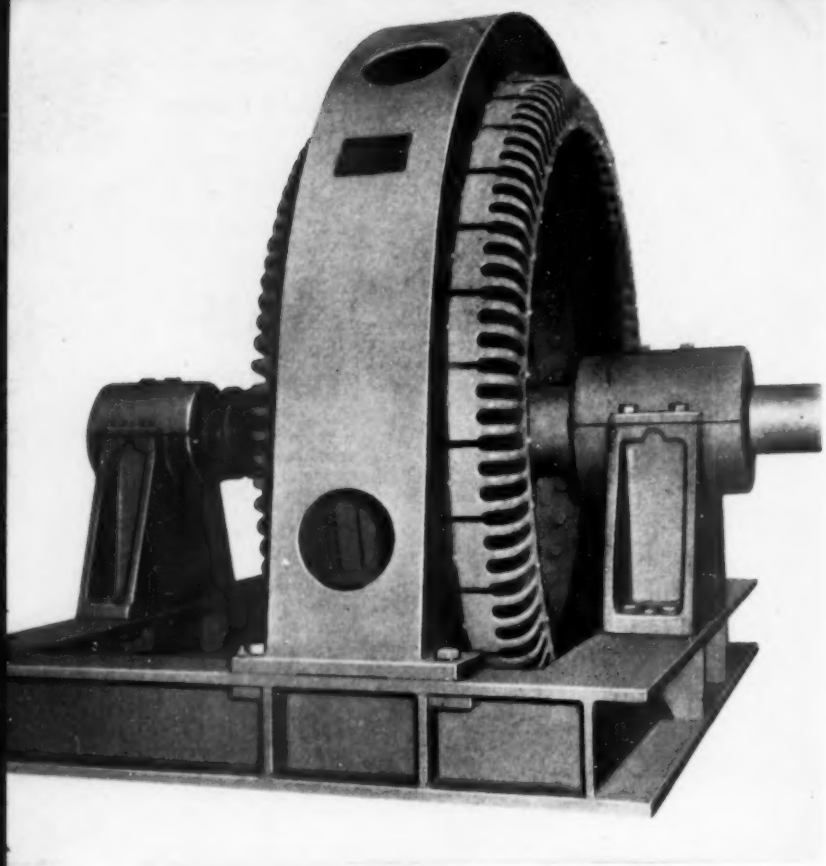
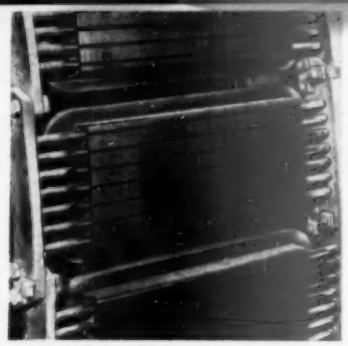
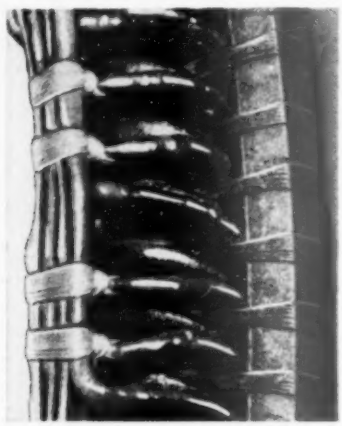


A G-E SYNCHRONOUS MOTOR, matched to your ball mill, is modern in design, neat in appearance, and built to give years of safer, more dependable service. Strength and rigidity are assured by fabricated construction and careful annealing of steel in rotors. Special coil and connection reinforcement gives extra protection to withstand the vibration and shock inherent in ball-mill operation.



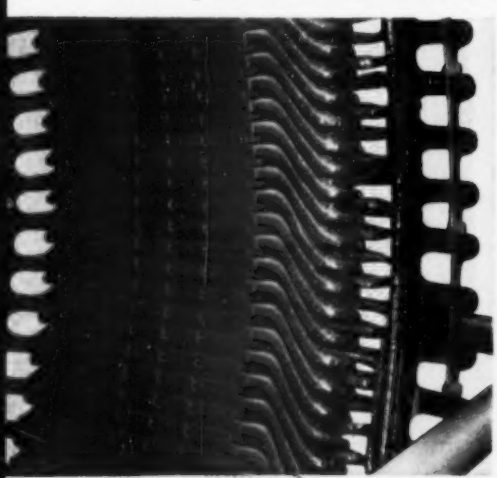
END SEGMENTS are sectionalized and securely bolted between poles. This rugged squirrel-cage winding assures more than ample strength for long motor life.



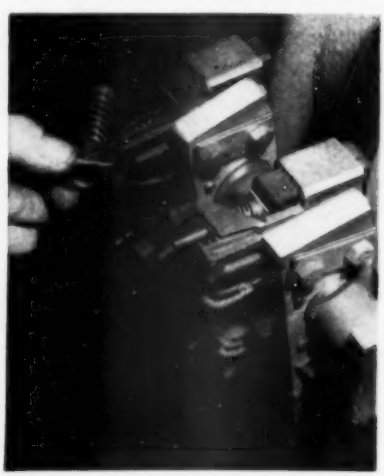
ARMATURE COILS are securely laced to an insulated support ring which, in turn, is rigidly attached to the stator frame.

G-E Synchronous Motors Specially Designed

RAPID, ROUTINE MAINTENANCE MEANS LESS DOWNTIME BECAUSE . . .

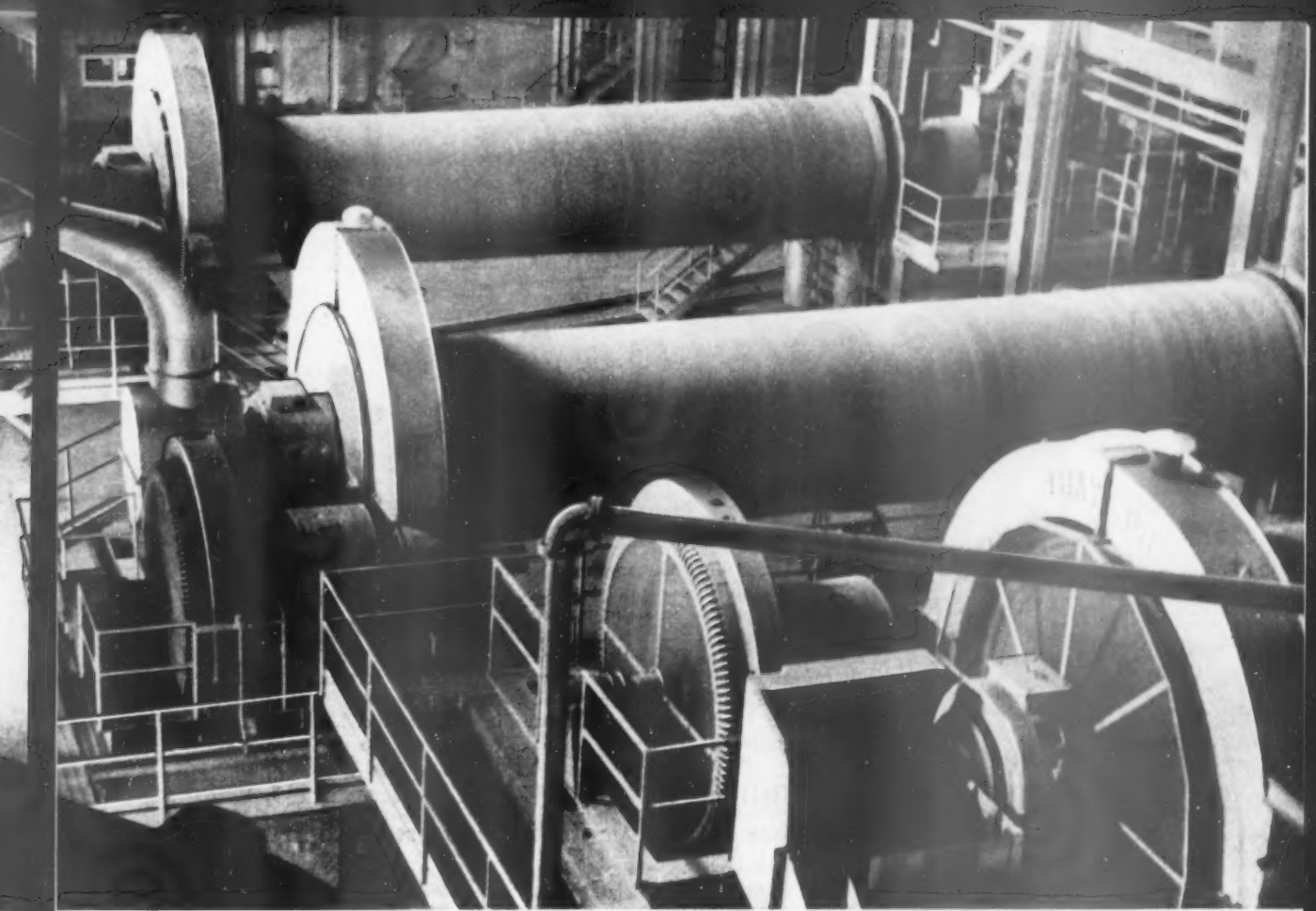


1 GLOSSY VARNISH on windings acts as moisture barrier, resists dust adhesion, cleans easily. Clean windings mean longer insulation and machine life.



2 BRUSH-PRESSURE ADJUSTMENT is fast and easy with spring-loaded holder. Brushes are staggered for uniform wear giving maximum collector-ring life.

3 SNAP-TOP COVERS and sight gage make lubrication fast and sure. These convenient features encourage regular checking of oil-level.



THREE G-E TYPE-TS, 180-RPM SYNCHRONOUS MOTORS DRIVE TRAYLOR BALL MILLS AT IDEAL CEMENT CO., PORTLAND, COLO.

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Ball mills are one of industry's "tough" drive applications. Motors must be able to meet torque requirements, withstand vibration, and run long periods without shutdown.

G-E synchronous motors are literally tailor-made to meet these requirements. Engineering and manufacturing experience obtained in building hundreds of motors for ball-mill drives and the proved dependable performance of G-E synchronous motors on all types of heavy-duty applications assure you of a motor that will withstand unusual demands and require only a minimum of maintenance expense.

Be sure to evaluate the special design features of G-E synchronous motors when you consider your next ball or rod-mill drive.

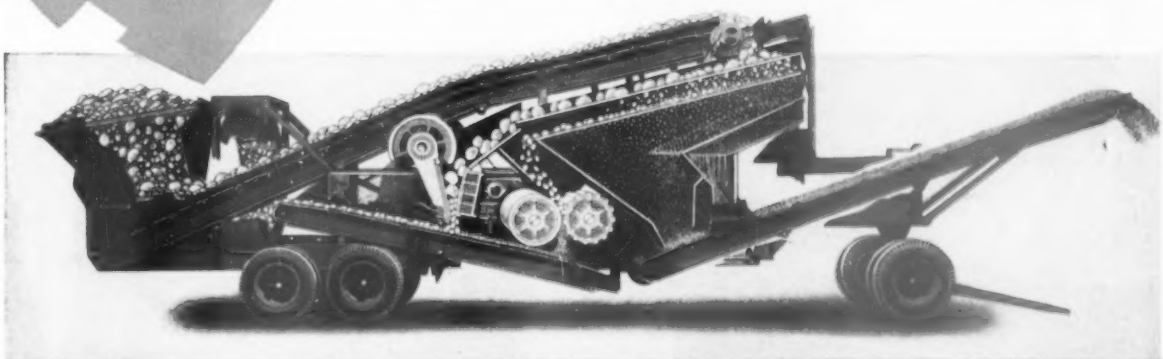
Contact your nearest General Electric office for bulletin GEA-5959 — *Synchronous Motors for Ball and Rod-Mill Drives* or write to Section 770-30, General Electric Company, Schenectady 5, N. Y.

You can put your confidence in —

GENERAL ELECTRIC

designed for MORE PROFITS

WITH UNIVERSAL'S "SCALPING DECK" METHOD



UNIVERSAL 880 GRAVELMASTER

Universal's "Scalping Deck" method of screening assures balanced loads to the jaw and roll crushers . . . provides greater efficiency and economy, protects screen, jaws, and rolls. You get better gradation of material, less jaw wear, less roll shell wear, longer screen life, savings in power, more effective use of screening area, faster material flow, greater plant output. These all add up to more tons per hour at less cost per ton with the new Universal 880 Gravelmasters.

Strictly for profit . . . buy a Gravelmaster. Get top engineering design. Get the rugged stability of a permanent installation plus ready portability to produce profitably anywhere.

Complete, compact Universal Gravelmasters are built in a range of streamlined sizes with capacities from 75 to 270 tons per hour. They're used extensively as complete gravel crushing, screening and loading plants, or to step up production as secondaries following a primary in quarry operations. For complete details on the size that meets your requirements ask your Universal distributor or write.

MODEL	Junior "B"	Junior	Senior "R"	Super Senior
Jaw Crusher	10"x16"	10"x24" 10"x36"	10"x36"	10"x36"
Roll Crusher	18"x16"	24½"x16"	30"x24"	40"x24"
Gyrating Screen	2'x8' 2½	3'x10' 2½	4'x12' 2½	5'x12' 2½
Plate Feeder	19"	19"	25"	25"
Weight	28,600#	44,500#	54,000#	59,600#
CONVEYORS				
Under Conveyor	18"x10'	24"x14'	30"x18'	30"x19'
Feed Conveyor	20"x23'	24"x26'	30"x29'	36"x34'
Delivery Conveyor	24"x18'	24"x20'	30"x21'	30"x24'
	Front Discharge Folding	Front Discharge Folding	Front Discharge Folding	Front Discharge Folding

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U. S. 31 & Fort Street — Telephone 1511

NILES, MICHIGAN

June 1, 1953

Thomas Foundries, Inc.,
Birmingham, Ala.

Gentlemen:

We examined our Series HL pump to-day after having operated it since January 1952 and we were more than pleased at the condition of the wearing parts. We believe the original wearing parts of our pump are good for a few more months operation.

The Thomas Pump replaced a pump made of manganese steel and we have a very tough problem handling oversize rock and plugging the line, but this problem has been greatly improved since using the Thomas Pump, plus the fact that it has already run many times longer.

The visits by your Representative have been greatly appreciated and we look forward to his visits and suggestions.

Yours very truly

NIEB CONCRETE PRODUCTS CO.,

Jess D. Nieb.

JDN/j

THOMAS DREDGE PUMP *Economical*

Michigan Operation Shows Longer Life and Better Handling of Large Rock

Thomas Durable Dredge Pump

Jess Nieb's experience is convincing. When a man like Mr. Nieb, after using a Thomas Pump, says it lasts longer and performs better—that's that!

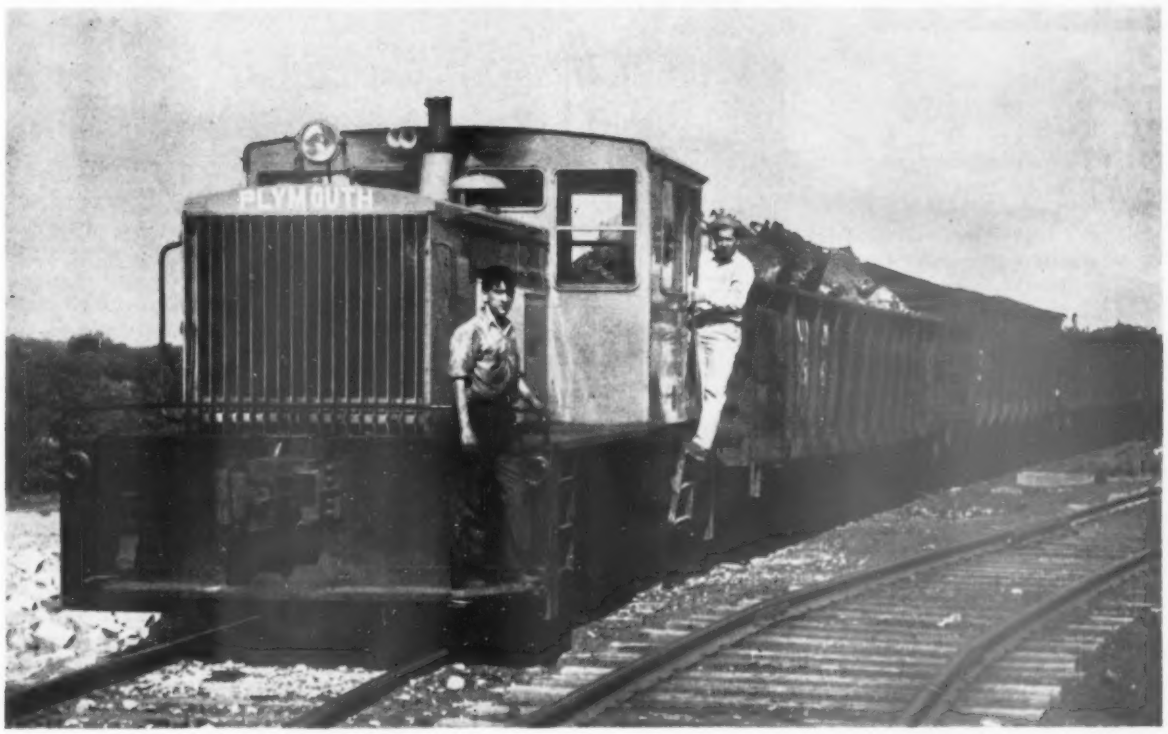
No theories. No sales talk. No propaganda. No claims. Just PROOF! You can't argue with experience.

If you have any use for a dredge pump, READ Mr. Nieb's letter. You'll find it profitable, to YOU.

For complete information about Thomas Pumps, write THOMAS FOUNDRIES, INC., P. O. Box 1111, East Birmingham 1, Alabama.

IF YOU DO IT WITH SAND & GRAVEL PUMPS, YOU CAN DO IT BETTER WITH A "THOMAS"

Fuel Costs Reduced to a Fraction



Fuel consumption was reduced tremendously when this efficient Plymouth locomotive took over at the Pittsburgh Ferrous Products Company (Mifflin Works), Glassport, Pa. Its predecessor, a tired but still running locomotive of similar size, had been using enough fuel each week to operate this modern Plymouth for more than eighteen (18) weeks. Time and money for maintenance also dropped considerably when this new Plymouth was acquired.

Popular with the operator are Plymouth's smooth operation, Torqomotive Drive*, and Forward-Reverse Action. Hauling up to 8 cars loaded with scrap metal over 2% grades and around tight curves, the 35-ton locomotive pulls, switches, and spots with sure, time-saving smoothness.

For full information on 3 to 70 ton Plymouth locomotives, including gasoline and Diesel TORQOMOTIVE, gasoline and Diesel mechanical and gasoline and Diesel electric, write to THE FATE-ROOT-HEATH COMPANY, Dept. A-5, Plymouth, Ohio.

*TORQOMOTIVE DRIVE: PLYMOUTH TRANSMISSION WITH HYDRAULIC TORQUE-CONVERTER

PLYMOUTH® LOCOMOTIVES

WITH TORQOMOTIVE DRIVE

ALSO MANUFACTURERS OF F-R-H CERAMIC MACHINERY

EAGLE

WASHING—CLASSIFYING—DEWATERING PLANT "AFLOAT"

AT PINE BLUFF SAND & GRAVEL CO., PINE BLUFF, ARK.

In addition to the thousands of "on shore" Eagle Aggregate processing equipment installations over the continent there are several of such "plants" afloat.

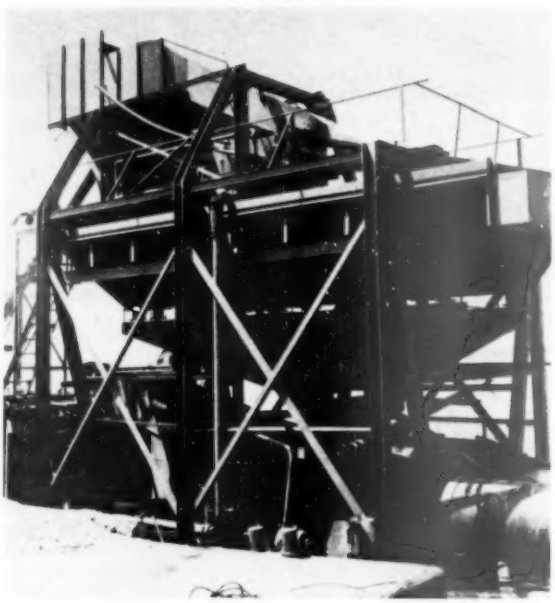
Latest addition to the water-borne is that of Pine Bluff Sand & Gravel Co., Pine Bluff, Ark. Their highly efficient set-up is shown here.

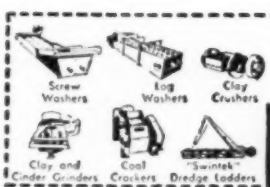
Material is pumped from the channel to a 4' x 14' two deck wet screen. Oversize is returned to the channel. Material from second deck is chuted to a barge. Material passing second deck is deposited in an Eagle 32' Double Water Scalping Tank. Here excess water is scalped and preliminary classification of sand takes place—heavy sand settling at the feed-in end and finer gradations at the middle and far end of the tank.

Through adjustable valves sand is bled to a collecting-blending flume. Various gradations of sand can be spouted to the Eagle 68" x 25' Long Weir Double Screw Fine Material Washer-Classifier-Dehydrator for final processing. Unwanted or excess gradations can be wasted, or found secondary market. End products are discharged into barges alongside the dredge.

In addition to use of the clean, specification aggregate at their ready mixed concrete plant, Pine Bluff finds a ready market for their premium material.

Whatever your type of sand and gravel plant—more than likely Eagle Equipment can improve your product—increase your business. Send for Catalog 47.





LEADERS IN AGGREGATE WASHING AND CLASSIFYING EQUIPMENT FOR HALF A CENTURY
137 HOLCOMB AVE.
DES MOINES, IOWA

EAGLE IRON WORKS

*Editor's page . . . .

A Way to Further Progress In the Ready-Mixed Concrete Industry

OUR SOURCES OF INFORMATION on the establishment of new businesses in the industries served by ROCK PRODUCTS and CONCRETE PRODUCTS show that there are far more newcomers coming into the ready-mixed concrete industry than in any other. Statistics on production also reveal that established producers are increasing their volume of sales substantially.

The ready-mixed concrete industry has developed to a volume of business in excess of one-half billion dollars annually over the space of just a quarter of a century and there is no sign of a let-up. Quality of product, service and fair price have built the industry. It is the maintenance and improvement of these advantages that will sustain acceptability of the industry's product and further its growth.

There are many small producers in the industry and there will be increasingly more in that class. These small producers must assume responsibilty, along with the larger operators, of putting a consistently good product on the market in order that the use of concrete will grow and prejudices against its use be overcome.

Industry Problems

This, to us, seems important and should command the attention of producers of aggregates, manufacturers of portland cement and suppliers of admixtures, air-entraining agents and equipment. If all who have an interest in ready-mixed concrete contribute their knowledge and help in every way to see that producers acquire proper guidance from reliable sources, there need be much less criticism of concrete jobs poorly done.

The rapid growth of the ready-mixed concrete industry is coming at a time now when there are trends underway which challenge the ability of the small producer and the large producer too, though perhaps to a lesser degree. With the increases in volume have come increasing problems to confront the producer.

There is a growing demand for better quality and control over uniformity of product. Strength specifications are becoming more prevalent which can give economic advantages to technically-informed producers and there is a trend to greater use of higher compressive strength concretes, up to six or seven thousand pounds per square inch and even more. More use of tests is being required and difficulties in sampling and testing as a measure of quality are mounting. Improper use of air-entraining agents and the selection of doubtful admixtures, which are being promoted widely, are causing difficulties. Many producers need help in meeting these problems.

Quite apart from these problems having to do with the physical properties of concrete, there are a host of other developments that must be met squarely in order for a ready-mixed concrete business to survive and prosper. The producer needs to know how he should go about writing a sound sales contract that will protect him against unjust claims by customers. He must recognize his growing responsibilities to his community, know how to give the utmost in service, handle labor disputes intelligently, learn how to calculate costs realistically, be adept at handling complaints and become a skilled merchandiser.

Exchange of Ideas

Because the industry continues its rapid growth and must face more and more perplexing problems we consider it fortunate that we have been privileged to publish the current series of articles on ready-mixed concrete being written by James A. Nicholson of the Nicholson Concrete Co., Toledo, Ohio. Before the series has run its course, it will have covered every conceivable phase of the business with a remarkably intimate and revealing discussion of everything from plant layout and quality control to the handling of complaints, merchandising and employe relations.

Now, we have a "panel of experts" as announced on page 265 of our August, 1953, issue, consisting of outstanding producers of ready-mixed concrete who have agreed to collaborate with Mr. Nicholson in attempting to answer questions asked by any producer about any problem he faces.

Our panel includes the president of the National Ready Mixed Concrete Association, two past presidents, as well as experts in merchandising technology and all other aspects. We think it a rare opportunity to benefit, for any producer who needs help in improving his product and his business, when such outstanding industry men offer their services to other industry members. Let's not allow this offer of help to go begging. The presentation of questions and problems to the editors for processing, is the best way for producers to show their appreciation to those who have so generously offered their assistance.

Bror Nordberg

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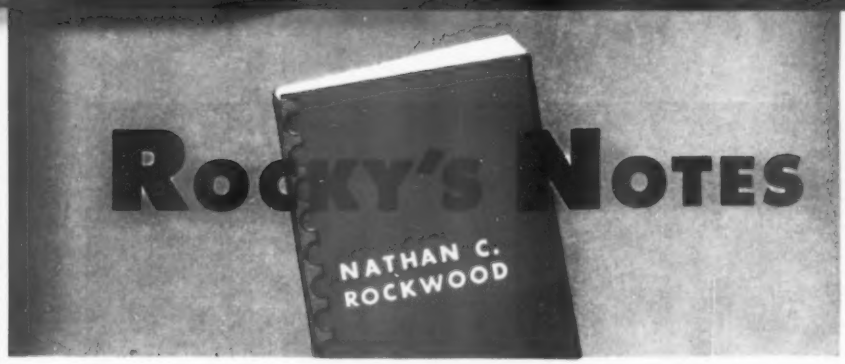


Concrete—Air Entrainment vs. Vibration

THE JUNE ISSUE of the *Journal of the American Concrete Institute* contains a collection of five papers on compaction of concrete by vibration—those papers delivered at the February, 1953 annual meeting. The thing that bothers us, and probably others, is how to harmonize the arguments in favor of air entrainment in concrete, as a cure-all for its shortcomings in durability, with the same end attained by compaction through vibration, which promotes sedimentation or consolidation—that is, eliminates so far as possible both air and excess water.

H. S. Meissner, research engineer, Bureau of Reclamation, in the introduction to his paper on "Compacting Concrete by Vibration," refers to the early practice of using earth-moist mixes with thorough tamping. He writes: "Those structures which remain of this early period attest that such methods produced concrete of excellent and lasting quality." The practice was abandoned, he says, because it was "too difficult to place [the mix] in narrow forms filled with reinforcing steel." So, the practice was abandoned in favor of sloppy mixes! He says: "The error in this trend soon became manifest but, like a bad habit once indulged, persisted too long."

Engineers are assumed to be logical, since they practice sciences based on natural logic. So, why should they ever have abandoned a practice that "produced concrete of excellent and lasting quality," merely because for one particular kind of structure only, it was difficult to place in earth-damp mixes? Had they kept up the practice for other kinds of structures, such as pavements and mass concrete, they could have escaped many trials and tribulations these 40-odd years. The invention and development of machinery and implements for placing this kind of a mix would have begun then. The only answer seems to be that engineers as a group are either timid about correcting bad construction practices, or are extremely reluctant to admit that they are ever wrong.

Less Water Better Concrete

Even before Duff Abrams' Bulletin No. 1 of the Structural Materials Research Laboratory at Lewis Institute, fore-runner of the Portland Cement Association research laboratory, the general significance of the water-cement ratio was recognized. As Mr. Meissner says: "Even among the builders who tamped the early earth-moist concrete, there was recognition of the fact that the drier their mix, the stronger it became." Nevertheless, it took the present generation of engineers on exploratory trips to Germany and extensive and expensive "research" and study of the autobahnen concrete pavements to rediscover what their fathers knew perfectly well, and even after this rediscovery they have not generally had the courage to insist on the old and proved methods, that the Germans never abandoned, but merely improved upon.

Instead they have resorted to various less direct methods of reducing the water content, or of removing some of the surplus water from the wet mix before it sets. It is probable that the chief permanent advantage of air-entrained concrete, if not the only advantage, is that the use of air-entraining agents permits the use of less water with the same degree of workability. In another paper on the same occasion, Lewis H. Tuthill, concrete engineer, Bureau of Reclamation, describing the results of "Vibration of Mass Concrete," while obviously an enthusiastic advocate of air-entrained concrete, says "Actually for interior concrete, since durability is not a factor, the air has served its purpose when it, instead of unnecessary cement, has contributed workability sufficient for placement by vibration."

Of course, by that statement he does not mean that durability is not important in huge hydraulic structures. As the rest of the text makes clear it is merely that there are other factors which cause lack of durability in such structures, not present in pavement. In mass concrete, lack of durability is more generally attributed to expansion of the green concrete from heat of hydration of the cement and subsequent shrinkage, and hence reducing the cement content through the use of entrained air provides workability, and the internal stresses of the concrete mass are reduced and the durability increased. According to Bureau of Reclamation tests, the vibrated concrete has lost only ½ to ¾ of a percent of its entrained air, which at placing was 3 to 4 percent. However, with 3 bags of cement per cubic yard of mix, and with a minimum of fine aggregate, this leaves probably no more entrained air than is always accidentally, or incidentally, entrained in any similar concrete.

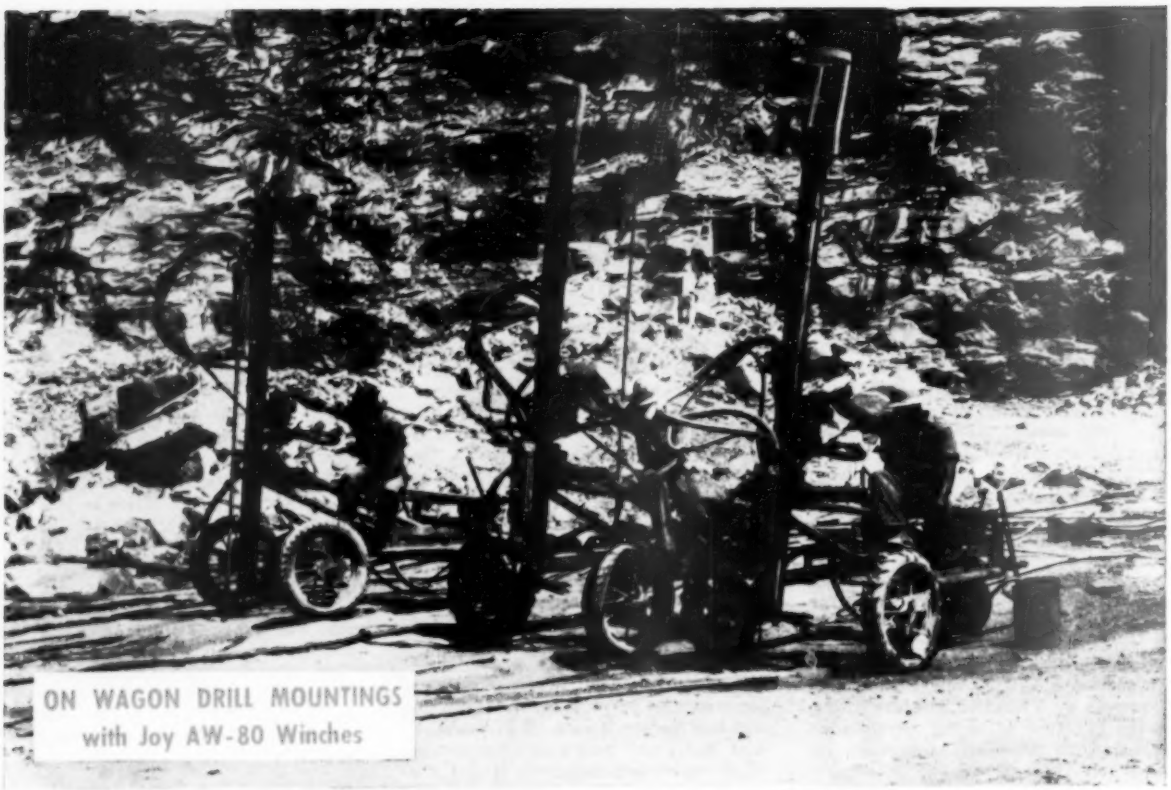
In a paper, "Effect of Vibration on Air Content of Mass Concrete," the author, Walter O. Crawley, Concrete Research Division, Waterways Experiment Station (U.S. Army Engineers) estimates that an air-entrained concrete mix suffers a 50 percent loss of air in 30 sec. of vibration; the wetter it is the more it loses. Hence, he concludes that "severe coarse aggregate segregation, and uneven air distribution and loss can occur when the vibration period is as long as 90 sec., if the vibrator is held in the same position."

If the lasting qualities of all good old concrete are due to accidentally entrained air, as some of our P.C.A. friends contend, it seems probable that with the dry mixes used and the coarser cements, it would have been impossible not to have entrained 2 or 3 percent of air. In other words we do not have to resort to the theory that air-entraining agents in the form of grease drippings necessarily had to be present. If that surmise is correct the present use of air entrainment has been adopted chiefly as a substitute required only for wetter mixes and finer ground cements, in the hope or expectation of accomplishing by easier construction methods the ends for which the older methods have proved satisfactory.

Vibration Substitute

One can not read these five A.C.I. papers, it seems to us, without coming to the conclusion that vibration of concrete mixes illustrates a trend in the right direction of returning, at least part way, to the older practice of dry mixtures. A great deal of space is devoted to the characteristics of various vibrators, low cycle (3500 to 6000 r.p.m.) and high cycle (9500 to 10,000 r.p.m.) but the conclusion seems to be that both types remove most of the entrained air —in fact practically all of it in ordinary structures—unless the vibrator is moved about within rather short time intervals. Since in pavement and general construction work these vibrators are ordinarily manually controlled or moved about, there can hardly be much uniformity in the air entrained concrete after it has been vibrated.

The most illuminating paper on the actual results of vibration (on laboratory specimens) is the one by Sven G. Bergstrom, Swedish Cement and Concrete Institute. This brings out quite clearly that to get desired results from vibration one must have just the right amount of water, or just the right gradation of aggregates. The two naturally do not go together. The end desired is a mix which is stable, or shows the least change in deformability during a certain period of vibration. This end can be approached through control of either the water-cement ratio or the gradation of the aggregates, which is nothing new, but is here demonstrated by a new method.



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LABOR RELATIONS TRENDS

U.S. Court of Appeals Upholds N. L. R. B.'s Ruling on Company-Owned House Rentals

By NATHAN C. ROCKWOOD

THE RULING of the National Labor Relations Board on November 24, 1952, in the case of Local 167, United Cement, Lime and Gypsum Workers' International Union (A. F. of L.), against the Lehigh Portland Cement Co.'s Fordwick, Va., plant management, was given on this page in our February issue, 1953. On that occasion the Board issued the following order: "Cease and desist from refusing to bargain with the union with respect to rental of company-owned houses or other conditions of employment, and making any unilateral changes in rentals of company-owned houses affecting the employes in the bargaining unit without prior consultation with union. Upon request bargain with the union with respect to any changes in rentals of company-owned houses occupied by employes in the bargaining unit."

This ruling was interesting and significant because fewer than half the plant's employes rented company-owned houses, the others either owning their own, or renting in the nearby area. The company evidently did not accept this ruling without protest, so, as the law provides, the N.L.R.B. applied to the U.S. Court of Appeals, Fourth Circuit (Richmond, Va.), for enforcement of its order. The Court handed down its decision July 21, 1953, which is given complete in what follows:

Text of Decision

"The question in this case is whether the Lehigh Portland Cement Co. was required by paragraphs 8 (a) (1) and 8 (a) (5) of the National Labor Relations Act as amended, 29 U.S.C.A. Supp. V, paragraphs 151 et seq., to bargain with the United Cement, Lime and Gypsum Workers' International Union, the bargaining representative of 254 out of a total of 288 of its employes, in respect to the rental of 65 dwelling units owned and maintained by the company in the vicinity of the plant. The Labor Board held that the housing units were a mandatory subject of the bargaining provision of the Act, 101 N.L.R.B. 1010, and has petitioned this court to give effect to its order whereby it directed the company to cease and desist from refusing to bargain collectively with the union in respect to the rentals.

Facts of Case

"The company maintains a plant for the manufacture of cement at Fordwick, Virginia, an unincorporated community of less than 1000 people. The company now owns 65 dwelling units located within a mile of the plant. This number remains out of a total of 150 units which were similarly located when it acquired the plant in 1916. Five of the 65 units are leased to non-employes of whom 3 were employed when their tenancy began; one is the mother of an employe who pays the rent, and one is the sublessor of an employe of the company; of the remaining 60 units 10 are rented to supervisory and clerical employes, who are outside the bargaining unit, and 50 are rented to employes who are members of the bargaining unit. The company pursues the policy of renting its houses to its employes and maintains the present allotment as between employes within and employes without the bargaining unit. Housing in the area is in short supply and consequently there is a demand for the company houses. There were 10 applications for them at the time of the hearing. Applications are not granted in the order in which they are filed or on the basis of the seniority of the applicants. The houses are maintained and kept in repair by the company. The rents in most instances are deducted from the wages of the employes and in other cases the rents are paid in cash at the company's office.

"The rental of the houses which had not been raised for fourteen years prior to 1951 were uniformly low. The company gave notice in March, 1951, that the rents would be raised as of May 1, 1951, and this announcement led to a protest on the part of the tenants and a request by them and by the union that the company first take up the matter with the union. The company, however, refused on the ground that the rent of the houses was not subject to collective bargaining, and the charges of refusal to bargain were then made which led to the instant proceeding. The question of rentals has not entered into the bargaining between the company and the union during the nine years in which the union has been the accredited representative of the men.

"A majority of the employes, 188 in number, do not live in company houses. Of these 131 own their own houses and 57 rent privately owned houses, located as follows: 37 own houses in the Fordwick area; 56 own houses in the nearby Craigsville area, and 35 rent houses in the Craigsville area, all of which are within two miles of the plant; 11 employes own houses in Augusta Springs and 11 rent houses in Augusta Springs, which are located within three to six miles of the plant; 24 employes own houses in Goshen and 9 rent houses in Goshen located within three to six miles from the plant; two employes own homes in Swoope, which is fourteen miles from the plant, and one owns a house in Headwaters, which is twenty miles from the plant; one employe rents a house in Staunton, Virginia, and one rents a home in Waynesboro, Virginia, which are located twenty-three miles and thirty-five miles respectively from the plant.

Theory of Employer

"The position of the employer is that the amount of rent which it charges for its houses does not relate to 'rates of pay, wages, hours of employment or other conditions of employment,' and hence it is not a matter as to which it is required to bargain with the union under paragraph 9 of the statute. It points out that the statute does not purport to interfere with an employer's freedom of contract, and hence it is at liberty to deal with its property as it sees fit, unless in so doing it does something which affects the conditions of employment under which its employes work; and it contends that these conditions are not affected in this case because the company's houses are not a necessary part of the business and employes are not required to occupy company houses in order to hold their places at the plant. Hence it is said that the present case is not covered by our decision in N. L. R. B. v. Hart Cotton Mills, Inc., 190 F. 2d 964, where we said that if company houses are a necessary part of an employer's enterprise or are rented to its employes at such a rate as to constitute a substantial part of their pay, they are a proper subject of collective bargaining.

Subject of Bargaining

"In that case, however, we did not lay down the general proposition that company houses are never the proper subject of collective bargaining unless they are a necessary part of the enterprise or their occupancy affects the workers' pay. It is sufficient to bring them within the field of collective bargaining if their ownership and management materially affects the conditions of employment. We agree with the Board that such is the case at the company's plant at Fordwick. That no increase in rent was made between 1937 and 1951 indicates that the rents have been below the prevailing rate; and this circumstance coupled with the convenience of living nearer to the place of work than the great majority of the employes has given the occupants of the company's

(Continued on page 135)

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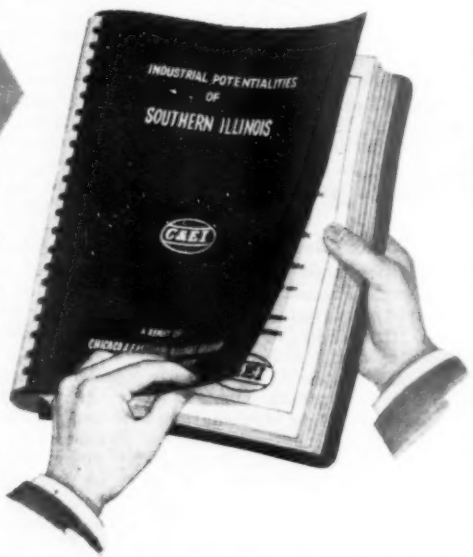

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PEOPLE in the news

On Board of Directors

SIR GILBERT DAVIS, BART., chairman and managing director of the Liberty Lime Co., Ltd., Lewes, England, has

Sir Gilbert Davis, Bart.

recently been appointed to the board of directors of Eastwoods, Ltd., of London, manufacturers of portland cement, concrete products, sand and ballast, building brick and tile. The company has been reorganized and modernized over the last 25 years by the efforts of its staff under the leadership of G. W. A. Miller, chairman and managing director. Sir Gilbert Davis has been in the cement business all his life and is well known to many leaders of the industry in the United States.

Heads Gypsum Group

GRAHAM MORGAN, general merchandise manager of United States Gypsum Co., Chicago, Ill., was elected president of the Gypsum Association at its annual meeting recently. He succeeds Noel J. Redmond, president, Blue Diamond Corp., Los Angeles, Calif.

Concrete Pipe Consultant

H. H. DICKEHUT, SR., following a five-month leave of absence, has returned to Texas Industries, Inc., Dallas, Texas, as staff consultant on concrete pipe. He will assist Arthur J. Clark, vice-president in charge of products plants, in the coordination of the sales and promotional efforts of the pipe division in Corpus Christi and San Antonio, Texas, and Shreveport and Alexandria, La. Prior to joining Texas Industries in 1952, Mr. Dickehut was vice-president of Acme Concrete Pipe Co. and general manager of Austin Concrete Works. A past director of the American Concrete Pipe Association, he has been associated with the concrete pipe industry since 1929.

Assistant Chief Engineers

CHESTER D. RUGEN, projects engineer, Universal Atlas Cement Co., New York, N.Y., has been appointed assistant chief engineer, and Robert B. Jordan, assistant chief construction engineer, construction engineering bureau, U. S. Steel Corp., Fairless Works, Morrisville, Penn., has also been appointed assistant chief engineer of the cement company.

Mr. Rugen joined the engineering department of Universal Atlas in 1930. He became operating engineer in 1942 and returned to the engineering department as projects engineer in 1947. He is a member of the American Institute of Mining and Metallurgical Engineers and has served on committees relating to the cement industry.

Mr. Jordan became associated with U. S. Steel Corp. in 1937, serving in the construction engineering department of South Works, Chicago, Ill. He rejoined the construction department at South Works in 1940 and six years later was promoted to assistant chief construction engineer. He became assistant chief design engineer in 1951 and later in the same year was appointed assistant chief construction engineer at Fairless Works. He is a member of the Western Society of Engineers, Pennsylvania Society of Professional Engineers and the Blast Furnace and Coke Association, Chicago district.

Elected President

JAKE WILL, former vice-president in charge of aggregates operations, has been elected president of Southern Pacific Milling Co., Santa Barbara, Calif., to succeed W. H. Mathews, who has resigned but continues as a member of the board of directors. Mr. Will has been in charge of the various aggregates operations throughout the Tri-County area since 1941. L. C. Root is in charge of aggregates operations in Ventura County, which includes the El Rio Rock Co. and the Santa Paula Rock Co., and P. E. Holmes is in charge of aggregates operations in Santa Barbara and San Luis Obispo counties.

Heads Cement Firm

GALES M. BELL has been elected president of the Spokane Portland Cement Co., Spokane, Wash., to succeed Walter B. Neill, who has retired after nine years as president of the firm. W. W. Witherspoon, a director since 1946, has been elected treasurer. Mr. Bell joined the company as timekeeper in 1919 and later became a clerk at the mill at Irvin, Wash. In 1928 he was assigned to the Spokane office as accountant and purchasing agent. Mr. Bell was named secretary in 1931 and a few years later was appointed secretary-treasurer. He has been vice-president and treasurer since 1949.

Assistant to Vice-President

AUGUST R. RUMP, formerly manager of the New Brighton, N.Y., plant of the United States Gypsum Co., Chicago, Ill., has been named assistant to the vice-president in charge of operations. Mr. Rump has been with the company since 1939.

Chester D. Rugen, left, and Robert B. Jordan

Awarded Fuertes Medal

ALFRED L. PARME of the structural and railways bureau of the Portland Cement Association, Chicago, Ill., was recently awarded the Fuertes Graduate Medal at Cornell University's School of Civil Engineering, Ithaca, N.Y., for his work on the manual "Design of Cylindrical Concrete Shell Roofs." Mr. Parme has been associated with the P.C.A. for 10 years and during that time has contributed much to the development of valuable data in the design of storage tanks, rigid frame bridges, arch dams and on the ultimate strength theory of design.

Last November Mr. Parme was granted leave by the association to go to Japan as a consulting engineer for Overseas Consultants, Inc., where he was in charge of trial load analysis of the Kamishiiba Arch Dam on Kyushu Island. While in Japan he gave a series of talks at leading Japanese universities on reinforced concrete including prestressed concrete thin shell roofs and ultimate load design.

Receives Honorary Degree

MELVIN H. BAKER, chairman of the board of the National Gypsum Co., Buffalo, N.Y., received the degree of Doctor of Science in Business Administration from the University of Maryland, College Park, Md., at commencement exercises on June 6. Earlier this year Mr. Baker had received the degree of Doctor of Commercial Science from Carson-Newman College, Jefferson City, Tenn., of which he is an alumnus.

Association President

FRED P. CURTIS, president, Lyman-Richey Sand and Gravel Corp., Omaha, Neb., has been elected president of the Omaha Manufacturers Association to succeed Paul Engler of the Balbach Co.

Technical Assistant

NEIL FRANKLIN MEREDITH has been appointed technical assistant to Dr. Max Muller, vice-president in charge of operations and engineering for Basic Refractories, Inc., Cleveland, Ohio.

Elected Vice-President

GORDON TONGUE, president of Northwestern Portland Cement Co., Seattle, Wash., has been elected first vice-president of the Association of Washington Industries.

Named Vice-President

DR. JACOB O. KAMM, who resigned recently as professor of economics and director of the School of Commerce at Baldwin-Wallace College, Berea, Ohio, has been named vice-president of Cleveland Quarries Co., Cleveland, Ohio. Dr. Kamm, who is also a member of the board of directors, is nationally known for his lectures and books on economics. He expects to continue his lectures, writing and economics consultation work. Dr. Kamm graduated magna cum laude from Baldwin-Wallace College in business administration, received his M. A. degree at Brown University, Providence, R. I., in 1942, and became an instructor in economics at B-3 in 1946. He had previously served in a similar capacity at Ohio State University for a year.

Assistant Sales Manager

JOHN E. DOANE has been appointed assistant sales manager of Calaveras Cement Co., San Francisco, Calif., in addition to his duties as traffic manager. He joined the company in 1948 after serving as navigator and transportation officer in the U. S. Army Air Force.

John E. Doane

P.C.A. Engineers

EVERETT C. CRITES and James W. McKnight have been appointed regional highway engineers of the Portland Cement Association, Chicago, Ill.

Mr. Crites will serve the states of Missouri, Iowa, Minnesota, North Dakota, Montana, Kansas and Nebraska, and Mr. McKnight, with headquarters in Pittsburgh, will serve the states of Delaware, Maryland, Pennsylvania, Ohio and West Virginia.

Mr. Crites joined the association in 1929 and served as a field engineer in Kansas and Missouri before becoming a consultant to various governmental agencies on buildings, housing and bridges in Washington, D. C. A graduate of the University of Nebraska, Mr. Crites received a B.S. degree in civil and architectural engineering in 1926 and an M.S. degree in architecture in 1934. He spent three years as airport consultant for Army, Air Corps and Navy engineers. He also worked with the Public Roads Administration. Mr. Crites is a former chairman of the highway committee of the Washington, D. C., Board of Trade, has served as chairman of the airports committee, American Road Builders' Association, and is a member of the executive committee Air Transport Division, American Society of Civil Engineers.

Mr. McKnight succeeds W. J. McIntosh, who was recently promoted to district engineer in charge of the New York office. He joined the Portland Cement Association in 1941 as a field engineer in the Philadelphia office. A graduate of the University of Pittsburgh, where he majored in civil engineering and received his B.S. degree, he served for two years as a construction inspector and design assistant with the Pennsylvania Department of Highways, Harrisburg, Penn. During 1936 and 1937 he was assistant engineer of surveys and highway design for Allegheny County, Penn.

Plant Managers

W. H. TASCHEK has been appointed works manager at the Grants, N. M., perlite plant of the United States Gypsum Co., Chicago, Ill. He succeeds Jack Freeman. Mr. Taschek was formerly at the lime plant in New Braunfels, Texas. R. W. Deneke, formerly at the gypsum plant in Plaster City, Calif., has succeeded Harold E. Vogt as works manager at Heath, Mont. Mr. Vogt has been given a new assignment with the company.

Association President

CHESTER C. KELSEY, manager of the Asbestos-Cement Products Association, was elected president of the American Trade Association Executives at the recent meeting in Atlantic City. This association is the professional society of 1500 trade association directors in the United States and Canada.

Elected President

B. E. HARRISON, Tacoma, Wash., has been elected president of the Concrete Products Association of Washington, Seattle, Wash. He succeeds R. W. Condon of Seattle. Other officers include George R. Ruth, Longview, vice-president; E. Ellis Cummins, Yakima, secretary; and Verne Frese, Seattle, treasurer.

Sales Manager

R. E. KENNEY, formerly with the Miami Crushed Stone Co., Miami, Fla., has been appointed sales manager for Seminole Rock Products, Inc., Miami.

Named Vice-President

D. H. HENDERSON has been appointed vice-president of the Canada Crushed and Cut Stone Ltd., Hamilton, Ont., Canada.

Manages Cement Department

LIONEL SPRUNG has been appointed manager of the cement import department of the Belgian American Mercantile Corp., New York, N.Y. He was formerly vice-president and sales manager of a firm importing grey and white portland cement from Belgium and France, and aluminous cement from France and England. A graduate civil engineer of Brooklyn Polytechnic Institute, Mr. Sprung served in his early days as a construction engineer with The Foundation Co., and since 1921 has been actively engaged in the importation of portland cement to the United States.

President Honored

JOSEPH E. KENNEDY, president and founder of Kennedy-Van Saun Manufacturing and Engineering Corp., New York, N.Y., was honored recently at a dinner party in Danville, Penn., by more than 250 members and officials of the company, in celebration of his 90th birthday anniversary. Many congratulatory telegrams were read at the dinner, and in a brief address, Mr. Kennedy praised the firm's employes on their loyalty and production accomplishments and presented 25-year service pins to five members of the company.

Many more happy birthday celebrations, Mr. Kennedy!

Awards Ryberg Scholarship

J. EASTMAN HATCH, president, Utah Sand and Gravel Products Corp., Salt Lake City, Utah, recently presented the $200 William Ryberg Memorial Scholarship to Norman D. Clyde, engineering student at the University of Utah. The $200 scholarship award, which is sponsored by the company, is given each year to the outstanding junior engineering student at the university.

Assists Vice-President

ALAN B. COOK has been named assistant to the vice-president in charge of sales for United States Gypsum Co., Chicago, Ill. He was formerly district manager of the Lake Shore-Chicago district and will be succeeded in this position by George B. Hallowell, Jr., assistant sales manager. Lyle F. Yerges has rejoined the company as manager of product development for industrial products.

Managers Appointed

PATRICK H. RYAN has been appointed sales manager and William U. Townsend commodity manager of the asbestos products division of National Gypsum Co., Buffalo, N.Y. This is a new department formed after the purchase of the Asbestone Corp., New Orleans, La., and Smith Asbestos Products, Inc., Millington, N. J. Mr. Ryan was formerly manager of the St. Louis division of the Asbestone Corp. Mr. Townsend has been assistant manager of the industrial sales division of National Gypsum Co. and later export manager in Buffalo. Both will make their headquarters in Buffalo.

President Honored

CARL K. DALE, past president of the Columbus Concrete Block Association, was honored recently by the board of trustees of the Ohio Concrete Block Association, Inc., in recognition of his services in organizing the group as chairman of a Columbus committee. Mr. Dale is president of Al A. Dale & Son, oldest block plant in Columbus until a few years ago when operations were suspended to engage in the metal sash business. The block plant was founded in 1907.

Guest Speaker

PAUL N. DOLL, manager of the Missouri Limestone Producers Association, Jefferson City, Mo., was guest speaker at the Butler, Mo., Rotary Club recently. Mr. Doll, who is president of the Jefferson City Rotary Club, gave an interesting talk on limestone and with the aid of charts showed the evolution of the processing of limestone.

Director of Research

JAMES C. HICKS has been appointed director of refractory research for Kaiser Aluminum and Chemical Corp., Oakland, Calif., to succeed the late Leslie W. Austin. Mr. Hicks will make his headquarters at the research laboratory at Milpitas, Calif.

Joins Phosphate Division

THOMAS P. GARRAWAY has been named to the development department of the phosphate division of Monsanto Chemical Co., St. Louis, Mo.

OBITUARIES

WILLIAM A. GIBSON, vice-president and managing director of the Bradley Pulverizer Co., Allentown, Penn., died July 27 after a brief illness. He was 68 years old. Mr. Gibson was stricken suddenly while walking down the street after lunching with several friends. Well known in the cement and agricultural limestone industries, he had been managing director of the firm for 42 years. Formerly in the Boston office, Mr. Gibson went to Allentown 38 years ago to establish the Allentown branch.

OSCAR E. DAVIS, a pioneer in the cement industry, died August 6 at the age of 79. Mr. Davis started his career in the cement industry about 1900 as an electrician for the Wellston Portland Cement Co., Wellston, Ohio. Later he became assistant to superintendent Lou Barnes and then to J. B. John, now chairman of the board of Medusa Portland Cement Co. Later, when the Wellston plant was purchased by Lehigh Portland Cement Co., Mr. Davis was appointed superintendent, remaining there until the plant was closed. He then went to Mitchell, Ind., where a new plant was being erected. In 1909 Mr. Davis was sent to Mason City, Iowa, to build the company's plant and remained for 28 years. Retiring in 1934, Mr. Davis returned to Wellston where he resided until his death.

WILLIAM S. MILLER, retired superintendent of the Tompkins Cove Stone Co., Tompkins Cove, N.Y., died July 27. He was 85 years old. Mr. Miller, who retired in 1941, was a graduate of the Colorado School of Mines. He was an active member of the International Quarrymen's Association and received a citation from McGill University, Montreal, for his assistance and guidance in research work on silicosis as an occupational hazard to quarry workers.

A. M. WEANING, production manager and assistant operations manager of the Maple Grove, Ohio, plant of Basic Refractories, Inc., Cleveland, Ohio, died July 26 after a short illness. He was 56 years old. A native of Martinsburg, W. Va., Mr. Weaning was widely known in the quarry industry.

WALTER THOMAS MIDDLETON, former manager of the Canon City and Florence Vermiculite Co., died recently. Retired for a number of years, Mr. Middleton had been in failing health the past six months and was seriously ill for two days preceding his death.

JAMES PIERCE, former superintendent of the Onondaga County quarries, Syracuse, N.Y., died July 17 after a short illness. He had been associated with the county highway department for 40 years prior to his retirement in 1949.

CHAUNCEY L. SHARPE, manager of the Canada Gypsum Co., Ltd., Guelph, Ontario, Canada, died August 13. Born in the United States, Mr. Sharpe moved to Canada in 1946 from the company's headquarters in Chicago, Ill.

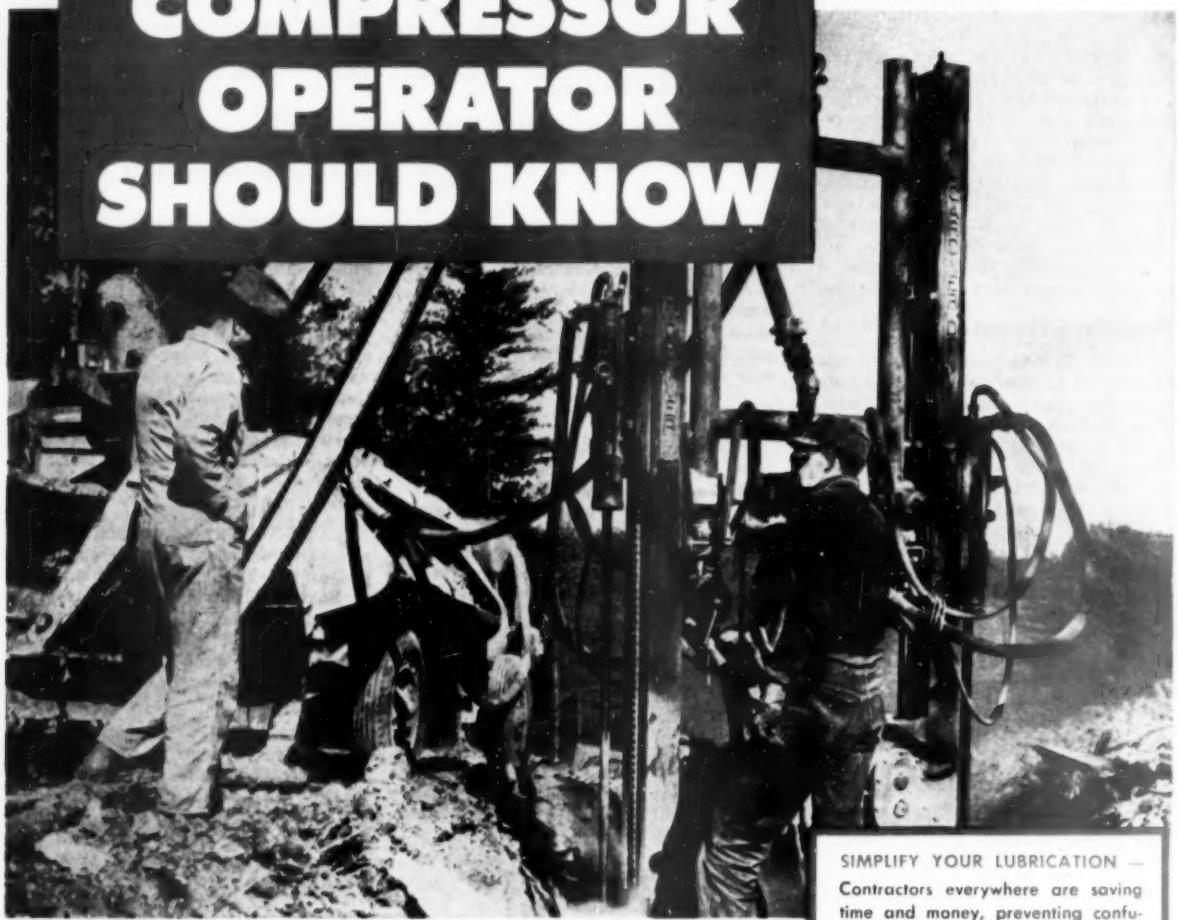
EUGENE G. FLUCK, president of the Alliance Sand Co., Inc., and an electrical consultant of the Dragon Cement Co., Inc., Northampton, Penn., died July 21.

H. STANLEY TIDLER, owner of the Tidler Sand Co., Lanham, Md., died suddenly on July 26. He was 63 years of age.

HARVEY R. KNITTER, assistant manager of Knapp Ready Mix Concrete Co., Monroe, Mich., died recently at the age of 48.

WHAT EVERY COMPRESSOR OPERATOR SHOULD KNOW

Photo Courtesy Gardner-Denver Co.



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FOR ALL CONTRACTORS' EQUIPMENT

industry news

Western Gravel Company Expands Operations

LIVINGSTON ROCK & GRAVEL CO., INC., Long Beach, Calif., has announced the acquisition of the Sunland, Calif., plant of City Rock Co.

The Livingston company has been in the rock, sand and gravel business in Los Angeles County since 1922 when its first plant was established in the El Monte area. Since that time, the company has expanded its production and distribution facilities until it is now one of the largest producers in the area.

Daily capacity of the company's operating plants, which includes the Kincaid plant near Azusa, the Palos Verdes plant near San Pedro, and the newly acquired Sunland plant, is from 1000 to 1200 t.p.h. The Kincaid and Sunland plants are sand and gravel operations, while the Palos Verdes plant handles a quarry product used primarily for road-base material. In addition to the above plants, the company also operates a sand plant near Long Beach and Wilmington, the product of which is used for a fill material and for certain types of road base. The combined deliveries from these plants have recently reached a total of 14,000 tons per day.

Livingston Rock and Gravel Co. is also engaged in an extensive ready-mixed concrete business, with plants located at Montebello, Artesia and Long Beach. The company maintains a large truck fleet, consisting of 32 ready-mixed concrete trucks, a bulk-cement tank truck and trailer, and 55 dump trucks, 40 of which are equipped with trailers.

About 300 people, including plant and office personnel, are employed by the company. The executive staff consists of Carder B. Livingston, president and manager; Ed Misenhimer, chief engineer; Harry Williams, sales manager; Ralph Wise, assistant manager and transportation manager; Howard Marsh, production manager; William Woodward, ready-mixed concrete manager; Ray Gardner, office manager; and E. R. Cox, master mechanic.

Cover Picture

THIS MONTH'S COVER of ROCK PRODUCTS depicts the interesting plant layout of Kentucky Light Aggregates, Inc., a wholly-owned subsidiary of the Ohio River Sand Co. This plant was built by the sand company to provide a new source of aggregate to supply its customers. The product is a calcined, expanded shale lightweight aggregate. At present only one rotary kiln is in operation, but three additional kilns, formerly used in the manufacture of cement, are available to increase production. The plant represents an investment in excess of $1,000,000. A complete description of the plant appears in this issue.

Phosphate Company Sold

CORONET PHOSPHATE CO.'S holdings in Hillsborough and Polk Counties, Fla., were recently sold to the newly-formed Coronet Division of Smith-Douglas Co., Norfolk, Va., for approximately $6,350,000. The sale included all the phosphate company's stock, a large defluoridation plant near Plant City, Fla., and mines and deposits in Hillsborough County and at Tenoroc in Polk County. Land tracts involved cover 12,515 acres of land, representing 4116 minable rock deposits. The Tenoroc mining facilities include drying and storage facilities capable of handling 500,000 tons of rock annually.

Coronet Phosphate Co., which reportedly has been producing about 10 percent of the national output of raw phosphate, employed more than 300 persons at peak production periods. B. G. Dabney, general superintendent, will retain the same position under the new management. Officers of Smith-Douglas, Inc., include R. B. Douglass, president; J. R. Sheffield, president of the new Coronet Division; and George H. Burt, secretary-treasurer of the new division. The company also recently acquired extensive properties in Texas.

Greece Cement Production

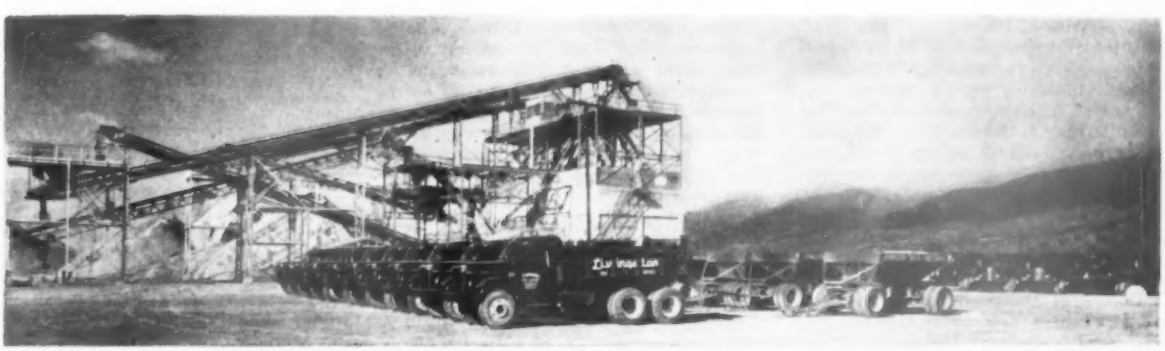
THE U.S. MUTUAL SECURITY AGENCY has reported that cement production in Greece amounted to 596,000 tons in 1952, compared with 101,000 tons produced in 1946. The increased production was due to expansion of cement facilities under Marshall Plan aid. Of the 596,000 tons produced in 1952, over 100,000 tons were exported.

More Freight Cars For Industry

THE PENNSYLVANIA RAILROAD recently announced that it has placed orders for 300 70-ton covered hopper cars for use in tranporting bulk cement, sand, lime and other materials which must be protected from the weather. The additional cars will increase the Pennsylvania fleet to 2526 2-pocket cars of this type. Deliveries on the cars, which will reportedly cost $2,300,000, are expected early in 1954.

Increases Capital Stock

TEXAS QUARRIES, INC., Austin, Texas, is increasing its capital stock from $275,000 to $550,000.



The Kincaid sand and gravel plant of Livingston Rock and Gravel Co., Inc., near Azusa, Calif.

Portland Cement Production

THE PORTLAND CEMENT INDUSTRY produced 22,698,000 bbl. of finished cement in June, 1953, as reported to the Bureau of Mines. This was an increase of 9 percent compared with the output in June, 1952. Mill shipments totaled 26,400,000 bbl., an increase of 5 percent over the June, 1952, figure, while stocks were 14 percent above the total for the same month in 1952. Clinker production during June, 1953, amounted to 22,232,000 bbl., an increase of 11 percent compared with the corresponding month of the previous year. The output of finished cement during June, 1953, came from 156 plants located in 37 states and in Puerto Rico. During the same month of 1952, 20,748,000 bbl. were produced in 155 plants.

Employe Training Program

THE MONARCH CEMENT CO., Humboldt, Kan., recently announced the inauguration of an extensive training program for present and future employes. The course will feature classroom and on-the-job instruction for all classes of employes. The program has been planned after an intensive study into the problem of keeping valuable, experienced employes abreast of the increasingly complex items of equipment prevalent in today's modern plants. The program is designed to give the worker a better understanding of his job in particular and of the operations of a cement plant in general. As opportunities for advancement arise, the director of training will work with the men awarded the job until the trainee becomes proficient in his duties. During the training period, the employe will be given tests to determine his understanding of the job. The program, as set up, is said to have the support of company officials and employes.

Industrial Safety

THE SOCIETY FOR ADVANCEMENT OF MANAGEMENT, with the cooperation of the American Society of Safety Engineers, has published a 32-page booklet containing 17 basic charts showing the progress of industrial safety work since the A.S.S.E. was formed in 1911 with 35 members. It now constitutes over 6000 members. Over 400 safety engineers, working in 33 different industries with a median employment of 1100, contributed to the compilation of the study on the progress of industrial safety programs. In the plants of these engineers, the lost-time frequency rate was reported as only 7.5 percent, and the lost-time severity rate as 0.58 percent. The estimated national average lost-time rate is about 100 percent higher.

Copies of the report are available at $1.00 per copy from the Society for Advancement of Management, 74 Fifth Ave., New York 11, N.Y.

H. C. "Pat" Maginn (lower left), executive vice-president, Calaveras Cement Co., San Francisco, Calif., awards gold watches and fobs, for completion of 25 years of service with the company, to: Dante Oneto (upper left), laboratory technician; Stillman Kathan (upper right), mechanic; and Luis Avila, packhouse worker

A.C.P. Act

THE NATIONAL AGRICULTURAL LIMESTONE INSTITUTE, in an administrative letter to its membership, has presented the following interpretation of the 1954 Agricultural Conservation Program, as recently signed by Secretary of Agriculture Ezra T. Benson.

The program, as finally passed, is felt to be a decided improvement over the outline indicated in A.C.P. 5, from both the standpoint of the farmer and the limestone industry. The final act will give farmers, through their state and county committees, a voice in the determination of A.C.P. policies and, significant from the standpoint of the industry, is the classification of the use of agricultural limestone in connection with soil conserving crops as an "enduring practice," in contrast to an "annual practice."

Another point emphasized was the removing of percentage or dollar limitations on the amounts which may be spent on agricultural limestone and other practices not labeled "permanent," a limitation imposed in the 1953 act which greatly restricted the use of agstone. Also, the practices which provide for the use of agricultural limestone have been substantially broadened. Now any farmer who needs to utilize limestone in connection with growing soil-conserving crops is eligible to receive A.C.P. assistance. The amount of assistance for each practice a farmer requests is determined by the local committee. The national A.C.P. bulletin provides that the rate of assistance may be up 50 percent of the cost of lime delivered and spread. Where federal "cost-sharing" is authorized, assistance for the practice is prohibited unless the minimum required applications, as determined by soil test or other approved basis, are made. Likewise, assistance is prohibited for applications in excess of the minimum need. Cost sharing for each of the listed practices is limited to "initial establishment," "initial treatment," or "initial improvement," which means that approval for the practice may be given, if needed, under the 1954 program, even though a similar practice was carried out on the same acreage under a preceding program. However, any maintenance, re-establishment or re-improvement of the practice on the same acreage will be the farmer's responsibility.

The association has estimated that the 1954 A.C.P. would result in about $25,000,000 to $35,000,000 of program funds for agricultural limestone practices, in contrast to the $8,000,000 previously indicated under the proposed A.C.P. 5. With the farmer at least matching this amount, the A.C.P. for 1954 would be responsible for $50,000,000 to $70,000,000 of agricultural limestone sales.

Group Insurance Plan

THE NATIONAL SAND AND GRAVEL ASSOCIATION recently announced that the proposed joint group insurance program of N.S.G.A. and N.R.M.C.A. has been approved by the insurance commissioner of the District of Columbia. The N.R.M.C.A. group insurance program has been in effect since April 1, 1953, when it established its required legal coverage of 600 lives, which automatically places the N.G.S.A. plan in immediate effect. Descriptive literature explaining the joint plan is currently being prepared. Previous to the merger of the two insurance plans, N.R.M.C.A. had issued a booklet for its members, entitled "Group Insurance Plan for You and Your Employes," containing a summary of the plan and other information useful to members in determining whether to participate in the plan. Until the new booklet is issued, copies of the N.R.M.C.A. booklet are being distributed as it is equally applicable to the joint plan.

Pavement Yardage

AWARDS OF CONCRETE PAVEMENT for the month of July and for the first seven months of 1953 are listed by the Portland Cement Association as follows:

	Sq. yd. awarded	
	During July 1953	During first seven months 1953
Roads	4,232,247	24,691,795
Streets and alleys	3,452,612	16,210,597
Airports	973,228	6,712,316
Totals	8,658,087	47,614,708

Safety Achievement

LONE STAR CEMENT CORP., employes completed the first half of 1953 without a single lost-time accident. This is the first time in the history of Lone Star, or of the entire cement industry, that a company operating as many as 12 plants has completed six months of continuous operation with a perfect safety record.

Limestone Tax Clarified

REPRESENTATIVES of the Agricultural Limestone Division of the Pennsylvania Stone Producers Association held a meeting with the administrator of the 1 percent Sales and Use Tax for the Pennsylvania Department of Revenue, at which time they were advised on the application and operation of this tax which became effective September 1, 1953. They were advised that the sales of agricultural liming materials to those engaged in farming, agriculture, or horticulture as a business were exempt from the 1 percent Sales and Use Tax. However, the sales of liming materials for use on golf courses, home lawns or gardens, or non-commercial gardens, are taxable under the acts. The collection of this tax is in compliance with the requirement of Pennsylvania legislative acts Nos. 85 and 86, of July 13, 1953.

Warner Expansion

WARNER Co., Philadelphia, Penn., in a recent report to its stockholders, reported that it is continuing its program of improvements to equipment and plants at all locations, which will require capital expenditures for the year of approximately $1,800,000. Included in this program are two projects which will result in a major increase in the production of central-mix concrete. A new concrete-mixing plant is being erected at the company's 51st St. yard, located on the west bank of the Schuylkill River. At its Tyson St. yard, located on the Delaware River in northeast Philadelphia, concrete-mixing capacity is being enlarged by over 100 percent. New dry bins for handling larger quantities of sand and gravel are also being installed.

Safety Booklet

THE NATIONAL SAFETY COUNCIL has announced the availability of its new employe rules manual, "Working Together for Safety." This 32-page booklet contains instructions in safe work habits applicable to employes in most plants. Included are a list of general safety regulations and special sections on machine operation, hand tools, power tools, protective clothing, fire prevention, materials handling, and other related topics. A free sample copy and prices for quantities may be obtained from the National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.

Expanded Shale Publication

THE EXPANDED SHALE INSTITUTE, Washington, D.C., recently published the summer, 1953, issue of *Concrete Facts*, the first issue of the institute's new official publication, designed primarily to supply information and technical data, concerning expanded shale and its uses, to the construction industry. The feature article of the first issue concerned the purposes and functions of the institute. Other items covered the use of expanded shale in the construction of bridges, ships and multi-story buildings. Illustrations included pictures of the new Statler Hotel at Los Angeles, Calif., the Republic National Bank of Dallas, Texas, Halle Bros. department store at Cleveland, Ohio, the ocean-going barge "Agate," and the Tacoma, Wash., Narrows bridge, all of which were constructed primarily of expanded shale lightweight concrete.

English Cement

AS RECENTLY PUBLISHED in *Cement and Lime Manufacture*, Associated Portland Cement Manufacturers, Ltd., at its annual stockholders meeting, reported that its affiliated plants produced 7,400,000 tons of cement in 1952, which was an increase of more than 700,000 tons compared with the previous year. The production per man, greater than ever before, was close to the rate achieved in the U.S.A.

In reference to the overseas plants of the company, a new kiln was reported in operation at the Australian plant. In Mexico, the capacity of the larger plant is being increased by 50 percent. In British Columbia, a new kiln and another plant are in operation, with further expansion of Canadian production being considered. In New Zealand, an additional kiln has been installed. In Malaya, a new plant is nearing completion and, in South Africa, it was proposed to increase the output of the Lichtenburg plant by the installation of an additional kiln. A new plant is also being considered for Southern Rhodesia.

Silica Sands of Kentucky

THE KENTUCKY GEOLOGICAL SURVEY recently announced the publication of Report of Investigations No. 5, on "Recent Investigations of Silica Sands of Kentucky." The sands discussed in the report are primarily those used for glass manufacture but also may have economic value for foundry purposes, filter beds, abrasives, sand blasting, engine sand, plaster, and other uses. The report includes a review of some of the outcrops previously reported by other investigators, and also, analytical data made available by various interested industries and individuals. Topics covered in the report include: Requirements and Specifications; Analyses; Summary and Conclusions; and References. Also included is a location map showing sources of sand analyzed.

Coming Conventions

September 19-30, 1953—
American Concrete Pipe Association, Annual Executive Committee Meeting, Castle Harbour Hotel, Bermuda

September 21-24, 1953—
American Mining Congress, Annual Convention, Seattle, Wash.

September 28-30, 1953—
National Ready Mixed Concrete Association, Semi-Annual Meeting of Board of Directors, Broadmoor Hotel, Colorado Springs, Colo.

September 28-30, 1953—
National Sand and Gravel Association, Semi-Annual Meeting of Board of Directors, Broadmoor Hotel, Colorado Springs, Colo.

October 8-10, 1953—
American Concrete Pressure Pipe Association, 5th Annual Convention and Meeting, Ponte Vedra Inn, Ponte Vedra, Fla.

October 12-14, 1953—
National Lime Association, Fall Operational Meeting, Tutwiler Hotel, Birmingham, Ala.

October 19-23, 1953—
National Safety Congress and Exposition, Conrad Hilton, Congress, Morrison and Hamilton Hotels, Chicago, Ill.

October 19-23, 1953—
American Society of Civil Engineers, Annual Meeting, Statler Hotel, New York, N.Y.

October 21-23, 1953—
National Industrial Sand Association, Semi-Annual Meeting, The Greenbrier, White Sulphur Springs, W. Va.

October 29-30, 1953—
American Concrete Institute, Southwest Regional Meeting, Rice Hotel, Houston, Texas

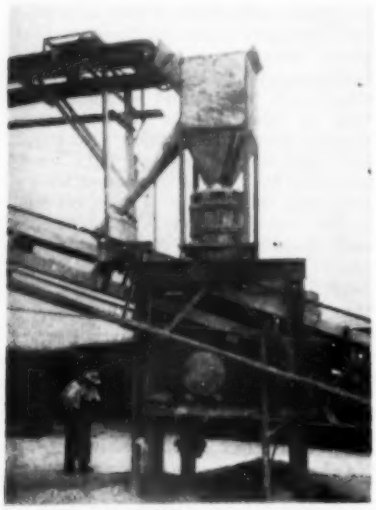
November 15-17, 1953—
Southeastern Concrete Masonry Association, Annual Meeting, Ft. Sumter Hotel, Charleston, S. C.

HINTS and HELPS

PROFIT-MAKING IDEAS DEVELOPED BY OPERATING MEN

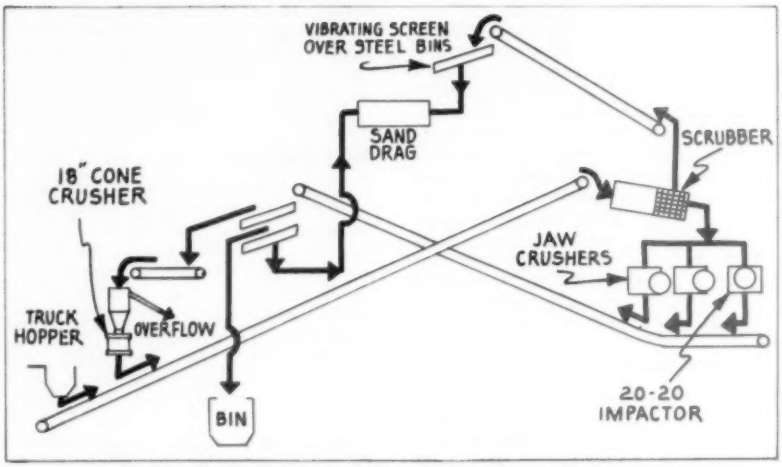
Choke-Fed Cone Crusher

LEON SAND AND GRAVEL CO. operates a 100-t.p.h. sand and gravel plant near San Antonio, Texas. The accompanying illustrations show the highlights of the operation. Plus 1½-in. material from the rotary scalping screen is reduced in the primary crushing section (not shown) and is returned by belt conveyor to the main



Material is choke-fed to cone-type crusher, using tall, rectangular feed box over crusher. Overflow spout returns excess material to scrubber section

belt serving the plant, or to a small Cedarapids screen mounted over a truck bin. All, or a part of the screen's product, can go to a flat-running belt serving an 18-in. Straub Gyracone crusher. This part of the operation is the basis for this "hint and help," for the Gyracone is choke-fed, using a rather tall, rectangular feed box over the crusher. If the box gets too full, an overflow spout diverts the excess material to belt No. 1, serving the scalper rotary washer screen. The Gyracone is fed, nominally, a minus 1½-in. plus 10-mesh product and delivers a minus ¾-in. product. Capacity is 16 cu. yd. per hr. (the material is a limestone gravel). The unit uses a 20-hp. motor and the crusher is started empty. A set of concaves and mantels is said to last for 20,000-30,000 tons. The cone crusher is set with a throw of ⅜ in. and is a precision-made crusher with forced feed-pressure oil lubrication. The plant is owned and operated by Charles M. Schoenfeld, Sr., and sons, Charles M., Jr., Wilbur and Perry.

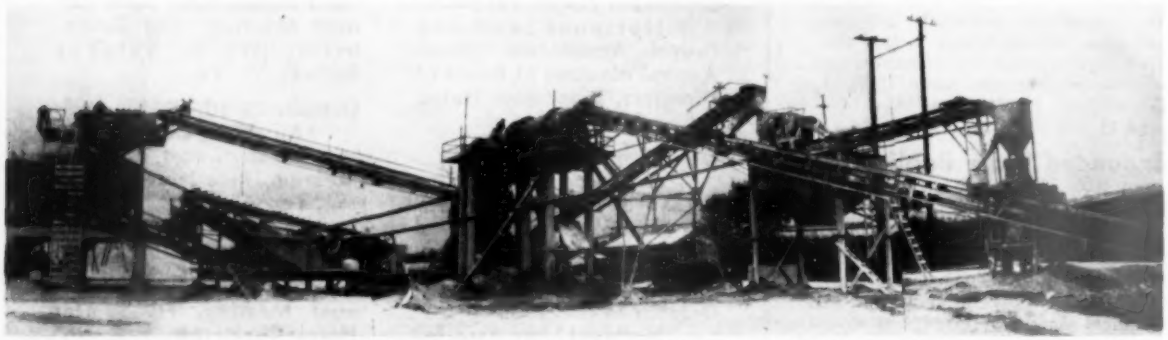


Sketch showing arrangement and details of sand and gravel plant operation

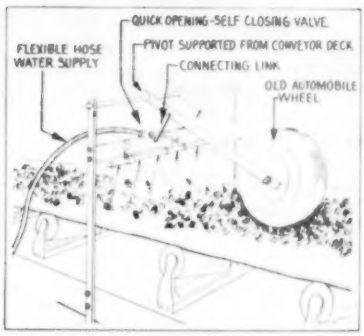
Reducing Dust Hazard on Conveyor Belts

AN ADMINISTRATIVE LETTER, written by the National Crushed Stone Association to member companies, describes and explains a new device designed for controlling dust on conveyor belts, as developed by Weston & Brooker Co., Columbia, S. C., and made available to the industry through the National Safety Council. The accompanying diagrammatic sketch shows the details of the apparatus and its operation. It shows a control device which shuts off the water spray when no stone or other material is on the belt. As pointed out by the association, many people have used or are using a mercoid-switch and an electric solenoid valve, the switch being actuated by a hinged bar or tube rubbing against the moving stone. While this works, the sensitivity of the mercoid switch is so critical that there is a constant make and break in the current, resulting in a non-uniform spray. The new control device reportedly overcomes the handicap. Its design and operation is as follows:

The unit consists primarily of an old automobile wheel mounted between two arms which are hinged to a support above the stone on the belt. The sprays are mounted below this hinge.



Flow of material is to rotary scalping screen and oversize is crushed in primary unit (not shown). Crushed material can return to the scrubber or be re-screened over center bin. The plus material from this screen can be re-crushed in 18-in. cone crusher at right. Sand drag is to the left



Sketch showing details of control device for water spray. Valve opens when wheel is raised by moving stone and closes as wheel falls to bare belt

directly over the moving stone, and have a quick-closing valve. The connecting link between this valve and the wheel arms must be of such proportions that the valve will open when the wheel is raised by the moving stone and close as the wheel falls to the bare belt.

It was also recommended that a strainer be used in the water line where dirty water must be used.

Recovering Added Fines

A SAND AND GRAVEL OPERATOR in the Southwest was required to increase the amount of minus 100-mesh material in his concrete sand. The pit material could only supply from 1 to 3 percent of the 5 percent required. To make up the deficiency, a sand-loam is trucked to the plant and fed continuously to the main stream of material by use of a cross-belt conveyor. The bulk of the sand is recovered later from a sand box ahead of a

Added fines are recovered by 3-in. pump and sent to 15-in. centrifugal cone

Cross-belt conveyor feeds sand-loam to main stream of material going to surge pile

double-screw, 30-in., Eagle sand classifier. The settling area in the screws was increased about 35 percent and the fines that settle in this added section are picked up by a 3-in. centrifugal pump and sent to a 15-in. Cottrell Whirleycone. About 30 to 40 percent of the total pulp overflow is sent to the liquid cyclones as that amount of pulp yields sufficient fines to meet requirements. A molasses valve is used to control the outlet of the Whirleycone. The unit is mounted above the sand screws so that the recovered fines blend with current production.

Wear-Resisting Liners

LINATEX is a product which until recently was produced only in the tropics. It is an extra tough rubber and comes in sheets $\frac{1}{32}$ to $\frac{1}{2}$ in. thick. It is claimed to be three or four times more resilient than conventional rubber and has the additional advantage that it can be used to repair a worn part by merely cementing additional Linatex over the old surface.

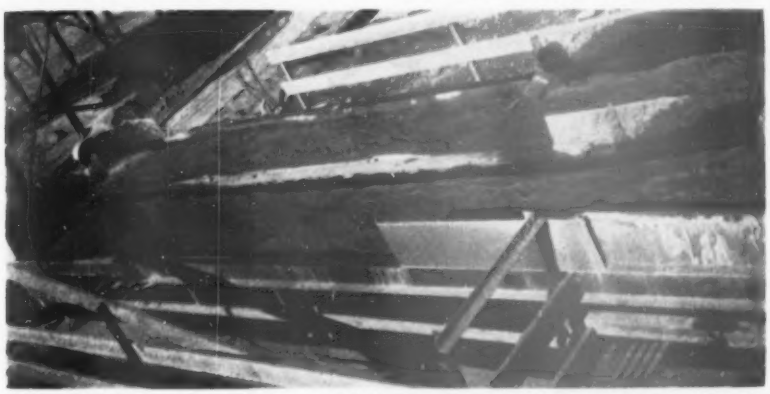
A portland cement company using Centriclones has found the material useful to repair sections of the liquid cyclone that are subject to wear. The material is also used to line the inside of elbows in pipelines carrying pulp. It is not intended for coarse ore impacts. Other uses include lining trunnions of ball mills, wear surface for belt conveyors, dust collector linings, and where sand is the abrasive material. It reportedly can be bonded to wood, iron or to itself by cold cementing. It is produced by Linatex Corp. of America, Rockville, Conn.

Recovering Heavy Minerals

SINCE THE ADVENT OF ATOMIC ENERGY, the names of such minerals as zircon, ilmenite, rutile, monazite, etc., appear almost daily in the press. These are only a few of the heavy minerals which may be present in sand and gravel deposits as these and many others are from igneous or granite rock. Since they are heavier than sand, they are usually separated out by gravimetric processes.

If a sand and gravel operator wishes to test his deposit for possible heavy mineral occurrences, the old gold miner's "sluice box" is a good starting point. It consists primarily of an inclined launder in the $\frac{3}{4}$-in. slope per foot range, and can be set up simply and inexpensively as follows: Place an old carpet in the bottom and, on top of the cloth, pile old and worn-out $\frac{3}{4}$-in. and larger wire cloth. Sufficient turbulence should be maintained so that the sand will be carried away and the "heavies" settle in the eddies made by the old screens. Run it a day and then wash the settlings into a tub. Weigh the material and send a sample to some laboratory for a complete mineralogical analysis. The weight of the material recovered and its value as determined by laboratory analysis, offers a basis for calculating the economics of recovering the minerals as a by-product.

The accompanying illustration shows two sluices, operated in a western sand and gravel plant, which are used for recovering gold. Two sluices are used so that one can be cleaned out while the other carries the load.

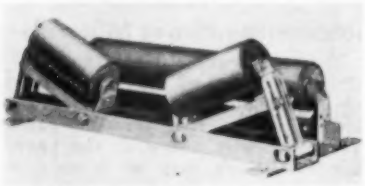


Gold and other heavy minerals are recovered through the use of inclined launders provided with old carpeting and screens

NEW Machinery

Belt Conveyor Idler

LINK-BELT CO., 307 N. Michigan Ave., Chicago 1, Ill., has developed a variable troughing belt conveyor idler, designed to provide smooth belt



Variable troughing conveyor belt idler

transition between troughing idlers and the flat pulley. The concentrator rolls have an inclined angle which is adjustable from 20 degrees to fully horizontal to permit a gradual belt flattening as it approaches the head pulley. The idler is available in two types; Series 100, for belt carrying all but heavy and coarse materials, in seven belt widths from 24 to 60 in.; and Series 200, for belts carrying heavy and coarse materials, in six belt widths from 36 to 72 in.

Clamshell

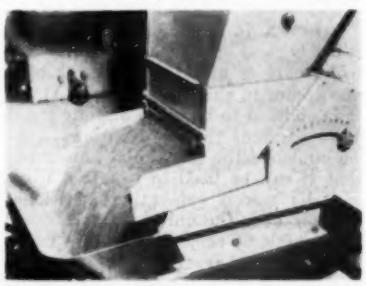
BALDWIN-LIMA-HAMILTON CORP., Construction Equipment Div., Lima, Ohio, announced production of a 1-cu. yd. shovel or 25-ton capacity crane known as Lima Type 44. The machine is available with either crawler or rubber mountings and, as a shovel, it is equipped with a 20-ft. boom and an 18-ft. dipper handle. Crane booms are available up to and including 100-ft., less the jib. The crawler truck consists of two structural H-beams welded integral with the side frames. The standard crawler is 12 ft. 3 in. long with 3-in. tread pads, however, a 15-ft. crawler can be furnished for crane,

Clamshell with 50-ft. boom and 1-cu. yd. clam bucket

dragline or clamshell operations requiring greater bearing area. The four front rollers are mounted in tandem on equalizer beams and the two rear rollers are mounted on rigid supports to provide an equal distribution of weight on a larger area of the twin roller paths. Anti-friction bearings, manual controlled clutches, a torque-converter, and all-steel cab with safety glass windows are included in its features. The unit may be converted from one combination to another by changing the front end attachment and making a few minor machinery changes.

Solids Feeder

RICHARDSON SCALE CO., Clifton, N. J., has developed a vibrating solids feeder which feeds rock, fertilizer, chemical products, etc. at a rate of from 0.1 to 20 c.f.m. The machine



Vibrating solids feeder rate is controlled by hand lever

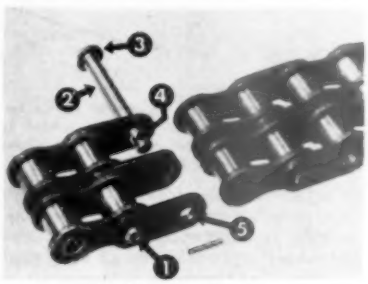
measures 28 x 17 x 19 in. and is operated by a ⅛-hp. motor. Normal angle of feed is five degrees downhill, but if necessary, it will feed five degrees uphill with somewhat of a decrease in production. The feed rate is controlled by a hand lever on the side of the machine, and may be adjusted at any time during a run. The feeder may be equipped with electronic controls to synchronize operation with allied equipment. An explosion-proof motor for hazardous dust conditions may be installed in the machine which comes complete with a mounting base.

High-Pressure Air Hose

BOSTON WOVEN HOSE & RUBBER CO., Boston, Mass., has announced the "Concord Yellow Jack," a high-pressure air hose for mining, tunneling and construction operations. Steel wire is used in the horizontal braided construction to permit working pressures up to 2000 p.s.i. and still retain flexibility. The hose has a specially compounded yellow covering to provide ready visibility in underground work. The hose is available in sizes from ¾- to 2½-in. inside diameter.

Riveted Roller Chain

CHAIN BELT CO., Baldwin-Duckworth Div., Springfield 2, Mass., has announced a riveted roller chain,



Single pin coupler link

combining the long-wearing characteristics of riveted roller chain and the ease of assembly of cottered chain. The chain is supplied in ASA standard and heavy series, 1-through 2½-in. sizes in multiple widths, and is made up in 10-ft. lengths with single pin coupling. Each 10-ft. section is boxed individually, and any even-pitch length of chain, from two pitches to 10 feet, can be made from one box of chain. Odd pitch lengths can be obtained by using a three-pitch riveted offset section.

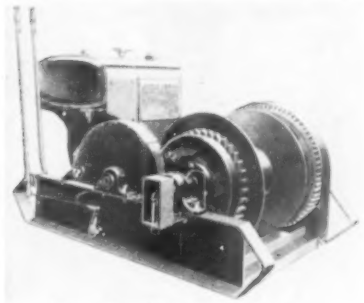
Recording Scale

THE HOWE SCALE CO., Rutland, Vt., has announced a mechanical weight recorder, the "Mechanoprint." It is built in as an integral part of the "Tape-Drive Dial" head, and is operated by the touch of a push bar. Printing also may be controlled by a trip switch on a conveyor line, monorail system, etc. The recorder is adapted for standard straight tickets, tickets and tapes, odd-size tickets and with identifiers, manual or electric time and date stamps, and consecutive numbering devices.

Mechanical weight recorder at side of dial

Box Car Puller

KING MANUFACTURING CORP., 3146 W. Chicago Ave., Chicago 22, Ill., has introduced a box car puller, Model 2510-H. The unit has a single



Car puller with free spooling drum

line pull of 12,000 lb. at 50 r.p.m., and utilizes wire cable with a free spooling drum. An oversize hydraulic clutch and anti-friction bearings are incorporated in the puller, as well as a Wisconsin VF4U air-cooled, 4-cylinder engine, which may be equipped with a self-starter mechanism if desired. An electric motor can be installed, or the puller may be had without power unit.

Particle Size Distribution Analyzer

SHARPLES CORP. Research Laboratories, 424 W. Fourth St., Bridgeport, Penn., has begun production of the Micromerograph, a high-precision instrument which determines the particle size distribution of powdered materials, such as cement, pigments, abrasives, etc. The powder particles are injected through a deagglomerator into a sedimentation tube where a servo-electronic balance weighs the settled powder and provides a continuous weight record. A particle size distribution curve is then obtained. Advantages claimed are attention-free operation, easy sample preparation, and positive powder deagglomeration. The instrument is housed in a complete, integrated unit and requires floor space of 13 x 23 in., and a height of 8½ ft. A cylinder of nitrogen is required for injecting the powder sample into the sedimentation tube through the deagglomerator.

Precision instrument determines particle size distribution

Conveyor Chains

BEAUMONT BIRCH CO., 1501 Race St., Philadelphia 2, Penn., has developed a combination chain for bucket elevators and conveyors. More efficient operation and increased service chain life is said to result due to additional metal on the wearing tread of each link. The block links are cast of either malleable iron or Beauco-CR metal depending on the application. Connecting pins of either forged or heat-treated steel are supplied with the respective links. The new chains, DT-102B and DT-111 are replacements for No. C-102B and C-111 standard malleable iron chains.

Shuttle Conveyor

HEWITT-ROBINS INC., 666 Glenbrook Rd., Stamford, Conn., has brought out a shuttle conveyor, designed for mine and quarry use. The conveyor extends 600 to 700 ft. by a rope haul and may be operated in headroom as low as 30 in. Proper alignment is assured either by small guide rollers fixed to the roof-jacks along the conveyor frame, or by use of tracks. Mechanisms located at the fixed discharge point, drive the conveyor forward or backward and tension the belt. With a minimum belt width of 24 in., the unit handles up to 250 t.p.h. and is available in lengths up to approximately 500-ft. centers. Intermediate sections of 8 ft. are equipped with rubber-tired, anti-friction bearing wheels and a covered deck to protect the return portion of the belt.

Dump Trailers

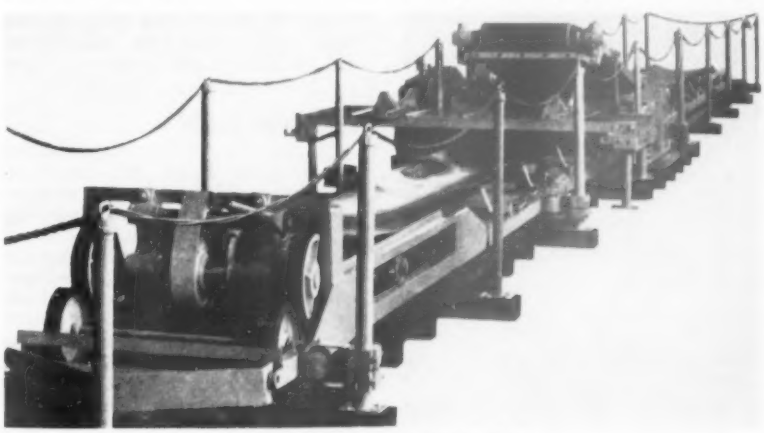
HERCULES STEEL PRODUCTS CORP., Galion, Ohio, has announced two telescopic hoist dump trailer packages

Telescopic hoist dump trailer

designed to increase the capacities for legal payloads and improve dumping performance. Features include extreme front mounting of the three- and four-sleeve twin telescopic hoisting mechanisms and the simplified method of packing the telescopic joints. The hoists and bodies are available on a "ready-to-roll" basis, or may be obtained separately for mounting on any trailer chassis.

Flywheel Coupling

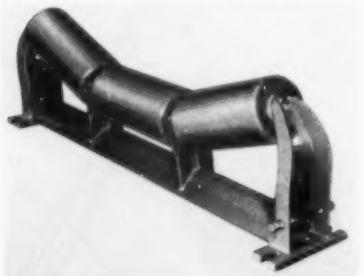
LOVEJOY FLEXIBLE COUPLING CO., 5009 W. Lake St., Chicago 44, Ill., has introduced a modification of the type CIF, a type C coupling with one hub cut off. It is designed for mounting directly to the center of the flywheel of gasoline and diesel engines. The coupling body is made of high-tensile semi-steel, and has holes drilled and countersunk to match the flywheel holes, thus providing more space between the drive and driven units. The unit collar, load cushions and inside sleeves are identical with the standard type C coupling.



Conveyor for close quarter operations

Conveyor Belt Carrier

STEPHENS-ADAMSON MANUFACTURING CO., Aurora, Ill., has developed a conveyor belt carrier, designed with spun end rolls and a welded steel

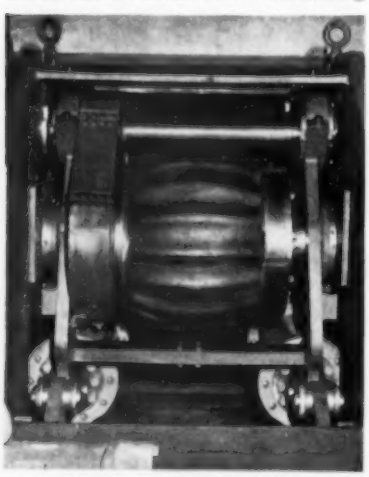


Conveyor belt carrier with spun end rolls

frame. Each seamless roller has an inner tube bored for roller bearings and die-cast labyrinth grease seals, while flexible, high-pressure lubrication tubes can be arranged for three-shot lubrication from one or both sides of the conveyor. An inverted angle cross-member and self-cleaning end-brackets are said to prevent material from collecting and clogging the rollers. Roller assemblies and parts are interchangeable.

Rock Crusher

WALDRIP ENGINEERING CO. AND WALDRIP SALES CO., doing business as Wasco, Hollydale, Calif., has introduced the "Latture" rock crusher, which has two opposed corrugated rotors, one concave and the other convex. The 30-in. dia. rotors have faces 20 in. in width, and revolve around an axis parallel to the two shafts. They are independently driven by accurately timed gears and are in constant mesh, fracturing the rock by multiple transverse loading. The rotors are made of a new alloy, Rocaloy, which contains chromium, nickel and molybdenum. A hydraulic system, which has an accumulator containing

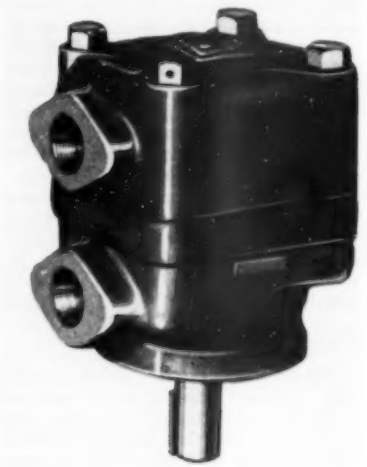


Crusher features two corrugated rotors, a concave and a convex

oil and gas, provides desired compression between the crushing members. The oil permits a positive pressure as required and at the same time the gas will compress sufficiently to allow the passage of tramp iron. The crusher is claimed to produce crushed stone at high capacity.

Vane Motors

VICKERS INC., 1400 Oakman Blvd., Detroit 32, Mich., is now producing two sizes of vane motors, Series M2-300 and M2-400, to supplement the previously released Series M2-200 and

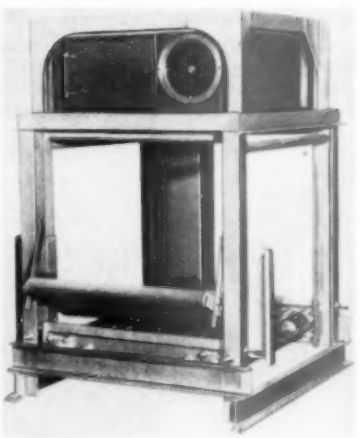


Automatic pressure loading vane motors

M2-500 units. Automatic pressure loading, automatic adjustment of radial and axial clearances, maintenance of a lubricating oil film on rotor faces and vanes, and rugged, lightweight construction are some features incorporated in the two series. A "rocking beam" construction provides contact between vanes and cam ring without the use of actuators. Four combinations of inlet-outlet port position are available by a choice of face, flange or foot-mounting, and either direct, belt, chain or gear drive. Series M2-300 motors are available in 7.7-, 10.2- and 12.8-hp. output sizes, and Series M2-400 motors in 16.6- and 21.6-hp. sizes.

Package Scale

THAYER SCALE AND ENGINEERING CORP., East Water St., Rockland, Mass., has added to its line of automatic weighing and filling scales, the Model 200S Checkweight scale. Model 200S automatically indicates the weight of filled bags, drums and cartons, and then separates the off-weight containers and properly filled packages by means of a two-way conveyor belt which may be mounted as low as 8 in. from the floor. If broken bags or cartons pass along the conveyor, the loose material from them falls through the slats to the floor



Automatic scale which detects and rejects off-weight packages

without altering the tare weight of the scale. A dial indicator shows the overweight or underweight of each package and, for added control, a horn within the scale sounds as each off-weight package is discharged. Additional indicators may be installed at remote control stations and colored signal lights may be furnished for indicating the weight classification of each unit.

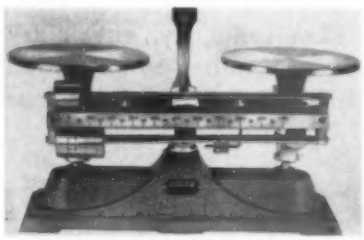
Side-Dump Trailer

EASTON CAR & CONSTRUCTION CO., Easton, Penn., has brought out Model TP-810, a side-dump, pan-type trailer for shuttle service in mines and quarries, with a capacity of 8 cu. yd. or 10 tons. The body is of welded ⅜-in. plate with box-section reinforcements and an oak floor cushion. To avoid excess wear on one side, the body may be reversed from end to end, the cab protector plate being bolted into position so it may be moved to the opposite end. For dumping, an electric overhead hoist is used, and a trailer stabilizer foot rests on the hopper wall to hold the body in level position. The trailer is equipped with the company's Model 20 rubber-mounted, quarry-type fifth wheel and standard spring axle, BK vacuum brakes, and dual lug type tires.

Pan-type, side-dump trailer for shuttle service

Precision Scale

OHAUS SCALE CORP., 1050 Commerce Ave., Union, N.J., announced the addition of a precision balance to its line of precision equipment. The balance features a micrometer poise which is designed for sliding along

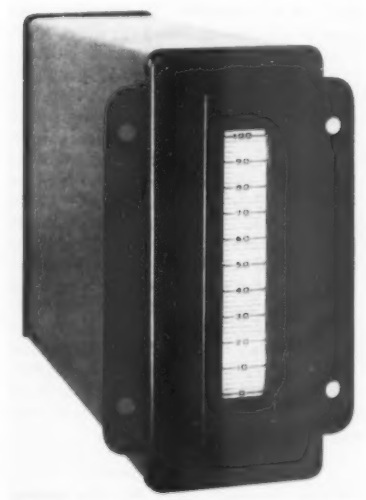


Balance with stainless steel plates

the beam for rapid traverse and rotation for final positioning. It is said to enable the balance to be used for a range of 0.5 to 1000 grams without additional weights. The scale is equipped with 7-in. dia. stainless steel plates and an etched aluminum graduated beam. Capacity of the scale is 5000 grams with a 0.5-gram sensitivity. Self-aligning bearings, balance beam of duralumin, and an undivided tare beam of 1-lb. capacity are additional features. In place of the flat stainless steel plates, two 9-in. dia. nickel-plated brass pans, or a 15- x 7½- x 4¼-in. seamless brass scoop with a stainless steel weighing platform, can be furnished.

Receiver-Indicator

THE FOXBORO CO., Foxboro, Mass., has added the Model 50 Consotrol Indicator to its line of process measurement and control instruments. The indicator is designed especially for graphic panel applications which require continuous indication of valve position or variables such as liquid level. All component parts are mounted on a removable chassis and protected by a housing secured to the panel back, thus permitting removal of the complete mechanism for servicing without disturbing the scale, case or panel. Zero, range and damping adjustments are then readily accessible. The instrument is available with single or dual indicating scales and can be adjusted for direct or reverse response to measurement, as desired. Alarm contacts of the mercury switch type are optional for various combinations of warning signals. The indicator scale measures ¾ x 4¼ in. and fits into graphic panel symbols.



Ribbon-type indicating receiver for graphic panel use

Front-End Loader

DROTT MANUFACTURING CORP., 3843 W. Wisconsin Ave., Milwaukee 8, Wis., announced the development of the 6K3 Skid-Shovel, designed exclusively for mounting on the TD-6

Loader with 3000-lb. lifting capacity

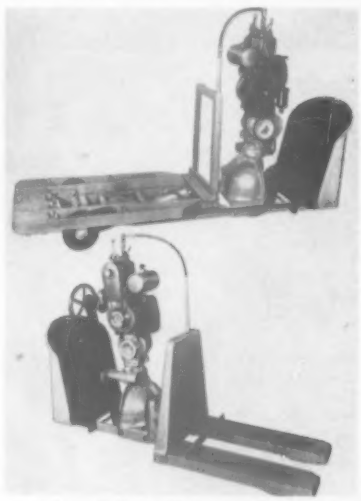
International tractor. The front-end loader has a ⅞-cu. yd., 3000-lb. lifting capacity with a digging or breaking-out force of 8500 lb. Features of the loader include shock reduction and reverse cylinder action. Various models are available for installation on the TD-6, TD-9, TD-14A and TD-18A International tractors.

Automatic Drives for Trucks

GENERAL MOTORS CORP., Truck & Coach Div., 660 South Blvd. East, Pontiac 11, Mich., has announced production of a Hydra-matic drive in the 19 model series 100 through 250. A 228-cu. in., 6-cyl., in-line engine develops 105 hp. under a compression ratio of 8 to 1, while a 248-cu. in. engine develops 125 hp. with a compression ratio of 7.5 to 1. Engines have a combustion chamber designed for anti-knock qualities; flat top aluminum pistons; and intake and exhaust manifolds and valves. The conventional clutch is eliminated and the engine braking force is transmitted to the rear wheels. Front axles of 4000-lb. capacity in models 280-22 and two-speed rear axle optional in models 300-24, give increased stability and resistance to road shock.

Hydraulic Lift Truck

KNICKERBOCKER CO., Truck-Man Div., Liberty St. at Thomas St., Jackson, Mich., has announced an improvement in Models DFP, a Pallet Toter lift truck, and DHP, a 4500-lb. capacity, heavy-duty, skid lift model. These models now incorporate an automatic, hydraulic, power lift. A hydraulic pump is installed directly on the engine and transmits a pressure up to 1000 p.s.i. through a 360-deg. swivel elbow fitting and flexible tube to the cylinder. The swivel elbow fitting allows full rotation of the driving and steering power turret. The heavy-duty chassis Model DHP is also available with a hand jack.



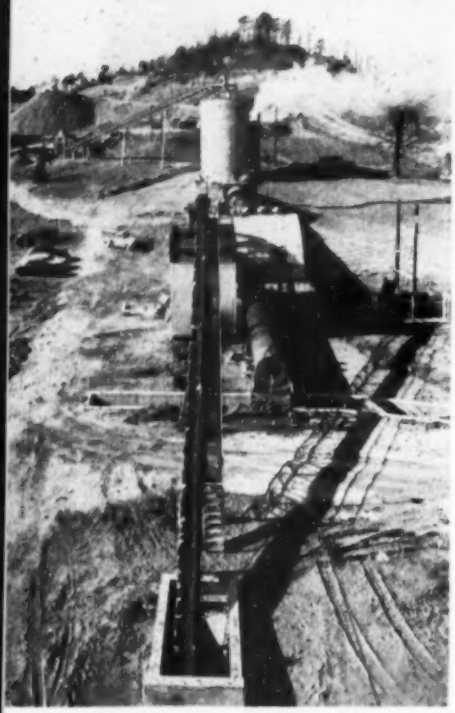
Automatic, hydraulic, power lift trucks

Portable Arc Welder

ROYAL EQUIPMENT CORP. 906 Main St., Burbank, Calif., has developed the Royal-Arc hand, portable, electric arc welder. The 110/220 a-c welder has a heat range of 15 to 200 amp., and is said to be shock free. Using either the metallic arc or carbon arc process, it can weld, braze, solder, cut or preheat, while an "electronic brain" feeds extra heat to the welder when needed.

Electric hand arc welder electronic control

FROM SAND and GRAVEL to LIGHTWEIGHT



New lightweight aggregate plant as seen from top of conveyors. Cooler in foreground unloads to horizontal belt conveyor in pit. Ridge in background is practically all shale of uniform composition

Kentucky Light Aggregates, Inc., Louisville, Ky., subsidiary of Ohio River Sand Co., Inc. produces Kenlite, an expanded shale aggregate in a plant which ultimately will have four calcining kilns and cost nearly $1,000,000

ONE OF THE REMARKABLE TRENDS of recent years has been the rapid development of artificial lightweight aggregate production facilities. Two new plants in the Kansas City area have started operation; North Dakota, South Dakota and California report at least one plant starting up. Texas continues to be a very large scale producer. New plants also are under construction in Oklahoma, Georgia, and Ohio. Several manufacturers of portland cement are reported to be on the verge of building large scale lightweight aggregate plants, and the cinder block industry is looking askance at its rapidly diminishing supply of cinders and displaying an increasing interest in other types of lightweight aggregates. This type of production obviously can cut into the total volume of hard aggregates, and old line sand and gravel and crushed stone producers who, looking at the yearly depletion of their source of supply, are watching the trend and debating what their next move should be.

One old time sand and gravel producer, the Ohio River Sand Co., Inc., Louisville, Ky., decided that the time was now ripe to protect its markets by building an ultramodern artificial lightweight aggregate plant. The new company, Kentucky Light Aggregates, Inc., is a wholly owned subsidiary of the Ohio River Sand Co., Inc., and the product has been named "Kenlite," the genesis of the name being from "Kentucky" and "light." The Ohio River Sand Co., Inc. is a large producer of gravel dredged from the Ohio River. It does not produce ready-mixed concrete or other types of concrete products and the lightweight aggregate is for customers only.

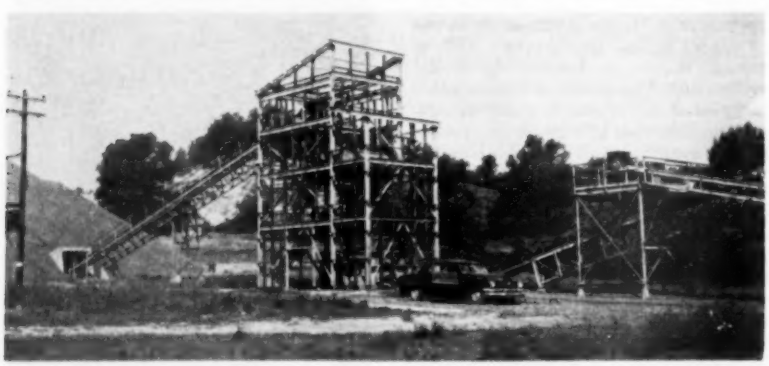
Plan Four-Kiln Plant

The new plant is about 16 miles south of downtown Louisville, alongside tracks of the L & N railroad. It is about 10 miles north of Ft. Knox. The surrounding area is covered with small trees and brush and is of little agricultural value. The plant now has one rotary kiln, but it is planned to eventually have four in operation. It is of steel construction throughout, and the screening and crushing buildings will be enclosed. It is an efficient and well laid out plant, representing an investment of approximately $1,000,000.

The future success of an artificial lightweight aggregate plant hinges on the quality of the product made. This goes back to an adequate and dependable source of supply of raw material. A second and vital requirement revolves about the efficient and economical handling of all raw and finished materials. The new operation at Kenlite, Ky., has all these essentials.

Sponsors of Kentucky Light Aggregates, Inc., used every technical and scientific method available to insure a high quality product and bolstered this by calling upon the "know-how" of others who were directly connected with the industry. Smithwick Concrete Products, Portland, Ore., was called in as a consultant on general plant layout and operation. The artificial lightweight aggregate plant operated by the Smithwick organization was described in ROCK PRODUCTS, January 1952, page 242. To check on the quality of the finished product and to advise users on the most advantageous handling of the product, T. B. Hartless of Richmond, Va., was retained as consultant. Detailed plant engineering and steel design were done by Klug and Smith, Milwaukee, Wis.

Finished material is an expanded shale, reddish brown in color. The calcined product is relatively small in size with many particles resembling the so-called expanded "coated" shales, with concrete made from it weighing from 70 to 105 lb. per cu. ft., depending on gradations and mix designs. The material meets all the specifications for artificial lightweight aggregates for structural concretes, roof and floor fill concretes and masonry units.



Showing conveyors serving crusher house No. 1, which will be enclosed for winter operations. At left is the surge pile

Mining Method

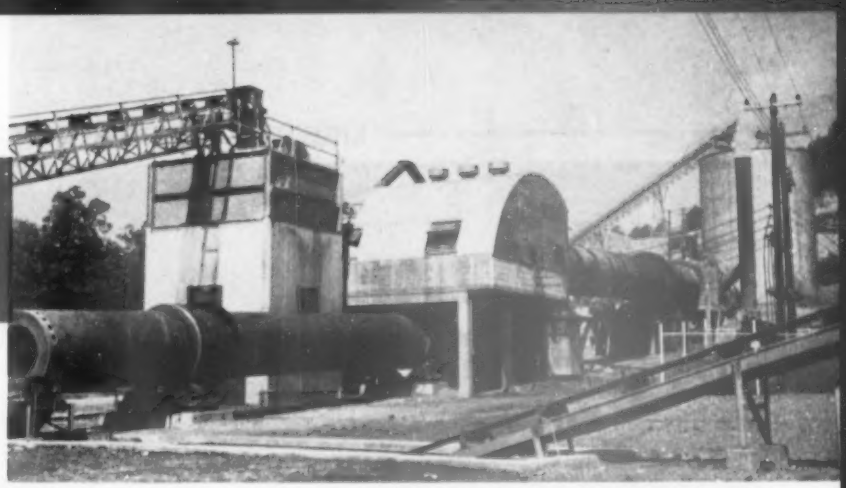
Raw material used for the manufacture of Kenlite is a blue shale, known geologically as the New Pro-

AGGREGATE

By WALTER B. LENHART

Above may be seen compressor and operator drilling; below is a front-end loader which loads trucks

vince shale. It is a true shale and relatively soft. The material has the blue-gray color of portland cement when first mined and must be protected from weathering after being blasted from its original bed and until it is put into the kiln. Under weathering, the cohesive chunks readily disintegrate. The material has been deposited in a bed of great thickness with the shale forming relatively thin horizontal bands or laminations. The raw material is of uniform composition throughout and ranges in thickness up to 130 to 150 ft. It is covered with 10 to 12 ft. of soil overburden as well as an oxidized layer of shale which is not suitable for expanding. After removal of small trees and brush, the overburden and oxidized material is removed by a TD-18 International tractor with a Bucyrus-Erie dozer which is augmented by a 10-cu. yd. road scraper. After careful removal of strippings and oxidized material, these waste products are currently being used nearby to build a 40-ft. high dirt-fill dam to augment fresh water supplies. The deposit is horse-shoe shaped with a crest line about a mile long. It is estimated that this is sufficient material to last 80 to 100 years based on the capacity

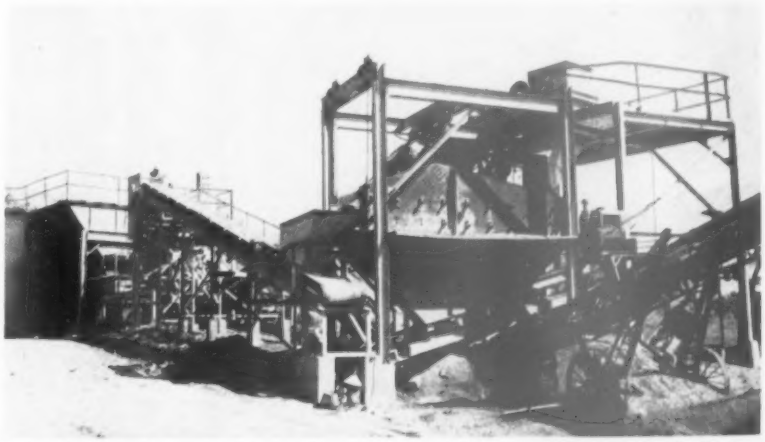


In this view may be seen the 5½- x 70-ft. cooler, the building housing the coal pulverizing and burner equipment, and the 8- x 125-ft. rotary kiln

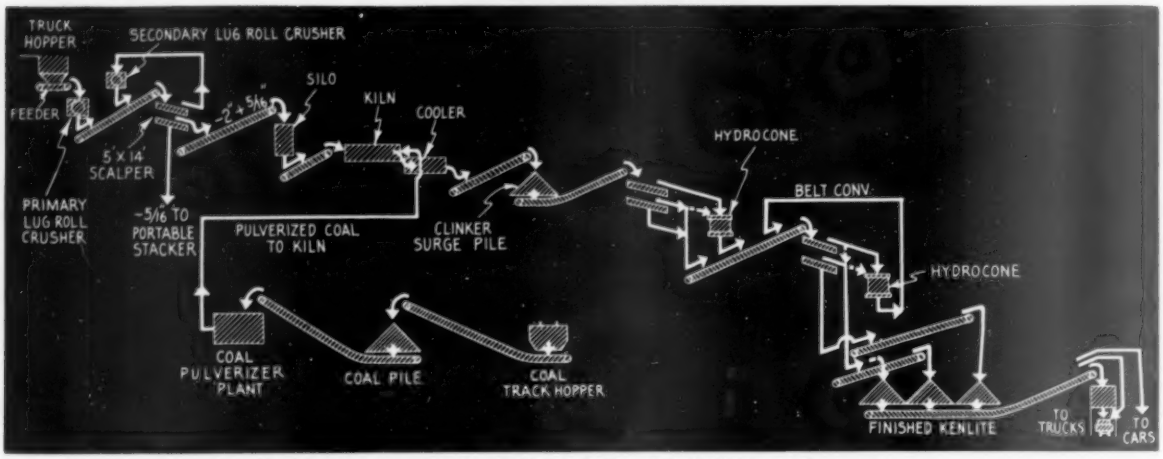
of four kilns. The shale bed, which is above the plant, is mined by conventional open pit techniques. Because of the laminar structure of the bed, as well as the presence of vertical and horizontal seams, blasting entails the use of small diameter holes on close centers and burden. A portable Ingersoll-Rand compressor with hand-held drills does the necessary drilling. Hercules powder is used. The shale drills very easily. After blasting the shale is loaded into conventional dump trucks, using a 1¼ cu. yd. Trackson D-4 machine.

Plant Operation

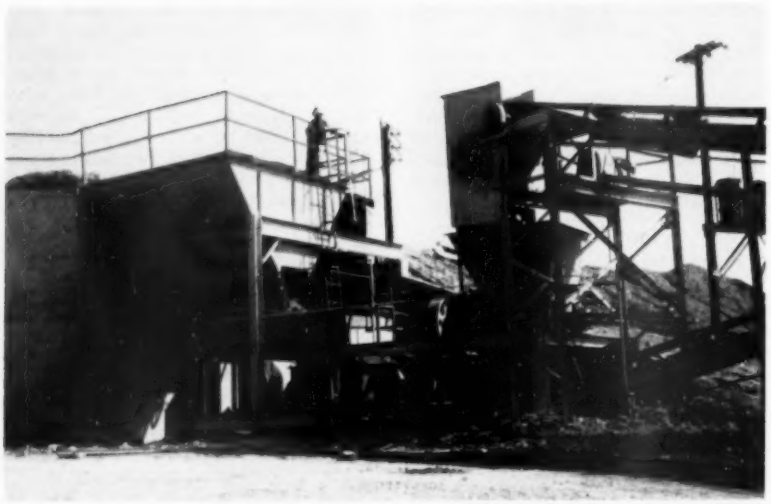
No expense has been spared in making the plant efficient, and the general layout is such that additional kilns can be added without disturbing production. Link-Belt conveyors are used throughout for transportation of all materials. The company purchased four 8- x 125-ft., Allis-Chalmers kilns, formerly in use at the Kingsport, Tenn., plant of the Penn-Dixie Cement Corp. Although only one of these kilns has been installed, as the market expands the others will be added. The raw shale is fed to an Eagle Senior double-lug roll primary crusher by a 36-in. Telsmith plate feeder. The crusher has two lug rolls each about 30-in. diameter and 42 in. long, with one roll rotating twice the speed of the other. The relatively long steel lugs or fingers are part of the rolls. The rolls revolve toward each other and are so sized and spaced as to deliver a minus 4½-in. product. The crusher operates at a relatively high r.p.m. and a truck load of pit material is quickly passed through the crusher. The primary crusher discharges to No. 1 conveyor belt which delivers the material to a 5- x 14-ft. Allis-Chalmers double-deck, low head screen with the plus 2-in. carried by No. 2 belt conveyor back to a secondary crusher which is also an Eagle Senior lug roll crusher, a duplicate of the primary crusher except for the size and spacing of the lugs. The primary crusher uses a 100-hp. motor and the secondary a 75-hp. motor. Throughs from the secondary crusher fall to belt No. 1 and are returned to the Allis-Chalmers scalper screen. Minus $\frac{5}{16}$-in. through the lower deck of the scalper is currently being wasted via a portable Barber-Greene conveyor. Later this material may be sent to the kilns. The plus $\frac{5}{16}$-in. minus 2-in. is elevated to the top of the kiln feed silo by conveyor belt No. 3. This silo is a Marietta concrete stave silo 50 ft. high and 36 ft. in diameter holding 1800 cu. yd. of raw material. The roof of the silo has been provided



In the background are the primary and secondary crushers. In the foreground is double-deck scalping screen. All minus 2-in. is sent to the kiln feed silo



Flowsheet of plant operations in the production of Kenlite lightweight aggregate



A 36-in. plate feeder under the truck hopper supplies a uniform feed to the double lug roll crusher below. Conveyor at right feeds the secondary crusher, also a double lug roll crusher

Looking down into the double lug roll primary crusher

with extra reinforcing so that later screen equipment can be installed over the silo should that become expedient. A similar silo will be added for each kiln later installed.

The raw shale feeds by gravity, through a hatch in the floor of the silo and a Simplicity vibrator feeder, an eccentric device, to conveyor belt No. 5 for delivery to the kiln. (Conveyor belt No. 4 is a future conveyor for delivery of shale from the discharge end of belt No. 3 to the future silos).

The 8- x 125-ft. rotary kiln is driven by a 30 hp. Allis-Chalmers motor using the original Allis-Chalmers drives. The kiln has been provided with Honeywell-Brown Radiamatic temperature recorder for the hot or front end of the kiln and on the back end a Honeywell-Brown thermocouple. A Hays recording draft meter is featured. Temperatures in the hot zone are held at 2000 to 2100 deg. F. at the front end and at the feed end are 900 deg. F. The kiln burns coal pulverized in a 4- x 8-ft. Kennedy-Van Saun air-swept tube mill, which reduces the coal to approximately 90 percent minus 200 mesh. The air stream through the tube mill carries the coal to the burner pipe in the kiln. This air must be preheated and is drawn from the hood at the hot end of the kiln after which it passes through a 3-ft. cyclone in order to remove most of the entrained dust before it passes through the mill.

The kiln discharges into a 5½- x 70-ft. United Iron Works rotary cooler that is lined for the first 25 ft. of its length. Lifter bars in the remaining section lift and drop the clinker which aids in the cooling and also helps to disintegrate any lumps. The cooler is driven by an Allis-Chalmers motor through a Falk gear-reduction unit. The bulk of the cool clinker discharges through 4-in. diameter holes at the end of the cooler shell. Any oversize clinker is discharged to a flat 5 in. steel grizzly over horizontal-running con-

veyor belt No. 6, which also receives the material passing through the 4-in., holes in the cooler. This belt is so installed that it can be lengthened to serve the other kilns when installed. The intent is to install the kilns on 25-ft. centers.

The cooler has two functions, first to cool the clinker so that it can be handled immediately by conveyor belt and second as a recuperator to economize on coal consumption. The air passing through the cooler provides all secondary combustion air, except for leaks, as the cooler and kiln are connected by a pair of connecting hoods. Motive power for the air is provided by a Buffalo-Forge Co. exhaust fan having a nominal capacity of 25,000 c.f.m. This exhauster is located at the cool end of the kiln and draws air through a Western Precipitation Co. Multiclone dust collector to remove the bulk of the entrained dust prior to discharge to the atmosphere through a 40 ft. stack.

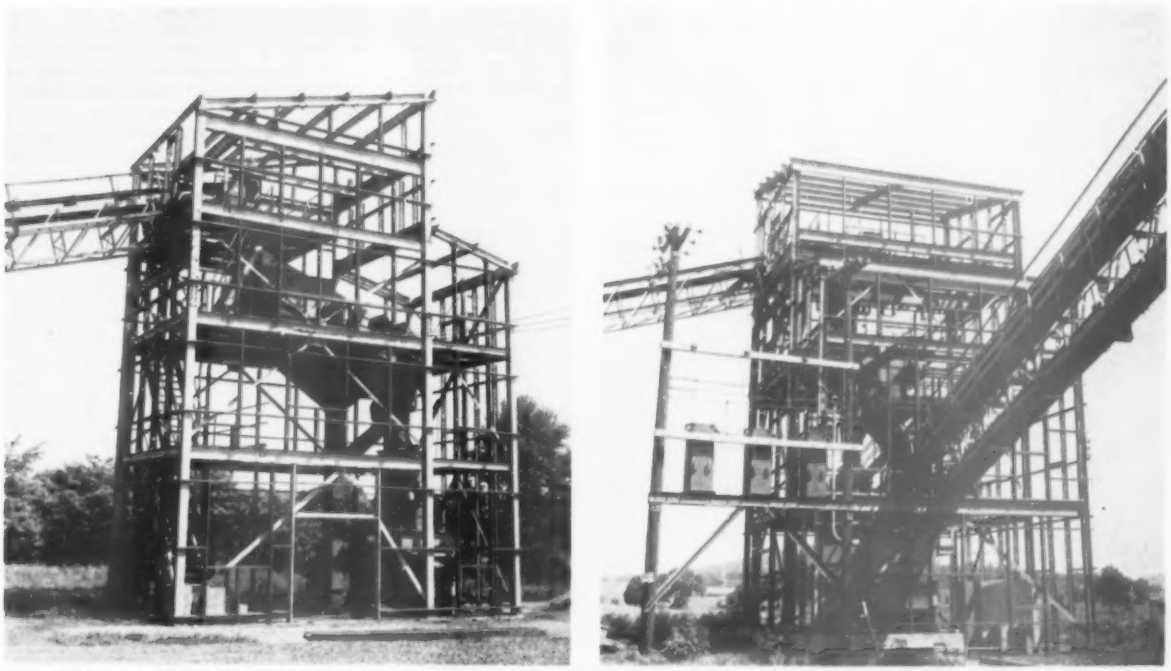
Dust from the Multiclone passes through a motorized valve and is sluiced to one of two relatively small tailings ponds. One is in use at a time, and they are periodically bailed out with power equipment. A 70 g.p.m. pump picks up water from these ponds and returns it to the dust collector pond for reuse.

The clinker from collector belt No. 6 is discharged onto belt No. 7 for elevation to a large surge pile ahead of the final screening and crushing sections. This surge pile, having a capacity of approximately 10,000 cu. yd. of material, permits continuous operation of the kiln and intermittent operation of the finish crushing equipment, for greatest economy in labor utilization. The kiln operates on a 24-hr. basis and has a capacity of 300 cu. yd. for a 24-hr. day.

Left to right: J. D. Duvall, superintendent; Philip D. Comstock, vice-president and chief engineer; and Allan Taylor, vice-president and sales manager. Background shows shale deposit

Conveyor belt No. 8 is located in a concrete tunnel beneath the storage pile and delivers clinker to the finish crushing operation, as required. This belt is fed by a Jeffrey electrical vibrating feeder mounted on a track so as to serve any one of three hatches spaced to reclaim maximum amount of material from the clinker storage.

The finished material is stored in three stockpiles: minus $\frac{3}{16}$ in.; $\frac{3}{8}$ in. to $\frac{3}{16}$ in.; and $\frac{3}{4}$ to $\frac{3}{8}$ in. One of the problems in an operation of this type is to have sufficient minus 100 mesh material in the products. Specifications call for 12 to 15 percent of this size in the minus $\frac{3}{16}$ material. The use of two Allis-Chalmers Hydrocone crushers and two Allis-Chalmers screens, in series, readily provide an adequate amount of the minus 100 mesh material as well as properly grading the entire size range so that the Kenlite can be most efficiently



Left: Finish crusher house No. 1 has 6- x 14-ft., double-deck screen followed by cone-type crusher. Right: Finish crusher house No. 2 has 5- x 14-ft., double-deck screen followed by cone-type crusher. Screen is in closed circuit with crusher, and conveyor at lower left returns crushed Kenlite to belt above, at left

To the left of the rectangular bin is the dust collector which removes stack dusts

used in the production of concrete.

From the clinker storage pile, belt No. 8 discharges to a 6- x 14-ft. Allis-Chalmers Ripl-flo double-deck screen, the plus ¾ in. being sent to a No. 636 Allis-Chalmers Hydrocone crusher. The throughs from this crusher as well as the other material passing through the screen, are moved by No. 9 belt conveyor to a 5- x 14-ft. Allis-Chalmers Ripl-flo double-deck screen with ⅜ in. mesh on the top deck and $\frac{3}{16}$ in. mesh on the bottom deck. This screen discharges to a double deck conveyor (belts Nos. 11 and 12) and to a No. 236 Allis-Chalmers Hydrocone crusher. Belt No. 12 conveys material to the $\frac{3}{16}$ in. minus pile continuously and belt No. 11 delivers to the ⅜ in. to $\frac{3}{16}$ in. pile, or by means of a tripper, to the ¾ in. to ⅜ in. pile, as required. A flop gate at the screen discharge is arranged so that the ¾ in. to ⅜ in. material is sent to the crusher when the ⅜ in. to $\frac{3}{16}$ in. pile is being filled and the smaller material to the crusher when ¾ in. to ⅜ in. material is required.

The throughs from this crusher are returned by belt conveyor No. 10 to belt No. 9 serving the finish screen. Thus the first crusher is in open circuit with the screen ahead of it, and the second crusher is in closed circuit with this screen.

The three finished material stockpiles are in line and above a concrete tunnel in which reclaiming conveyor belt No. 13 operates. By means of multiple hatches under each pile the finished material can be blended in accordance with customer requirements. Belt No. 13 elevates to a loading tipple so arranged that rail cars can be loaded direct from the belt and trucks can be loaded either from a steel truckloading bin or direct.

Coal is handled by means of a track hopper arranged so as to receive either rail or truck shipments. This hopper is provided with a 20-in. Telsmith plate feeder feeding belt No. 14 for elevation to an outside storage pile of 2500 tons. This stockpile is atop a concrete tunnel in which conveyor belt No. 15 operates, reclaiming the coal through gravity hatches and delivering to a day hopper.

Car and truck loading out tipple for shipping finished product

There are a total of 14 conveyor belts in the plant that range in widths from 16 to 30 in. The coal belts are 16 in. in width and the remainder of the belts are 20 in., 24 in. and 30 in. All conveyor equipment is Link-Belt mounted on conveyor galleries fabricated by the International Steel Co., Evansville, Ind., who also fabricated the crusher houses and other structures.

Conveyor belt motors as well as all other motors used in the plants are Allis-Chalmers with a connected load of about 600 hp. Eventually when all four kilns are installed the connected load will be about 1100 hp. The thermal conductivity value of monolithic Kenlite concrete is 3.15, or less, dependent upon weight of the concrete. An 8 in. Kenlite masonry wall has a heat transmission (U) value of 0.33 which can be reduced to approximately 0.17 by filling the cores with coarse Kenlite. The finished material is 64 percent silica with 32 percent iron, aluminum, calcium and magnesium oxides. Water soluble salts are in the 0.25 percent range. Kenlite monolithic concrete is said to withstand temperatures up to 2000 deg. F. Kenlite is said to have only 0.274 percent aggregate loss under A.S.T.M. accelerated sulphate soundness test, and high strength concrete of this expanded shale shows no change after 600 cycles of freezing and thawing. Kenlite concrete is approximately as strong as conventional hard-aggregate concretes; using Ottawa sand as 100 percent, Kenlite indicates 99.2 percent of this value. Walls made from this expanded shale concrete units can be nailed and absorb up to 50 percent of the sound waves that strike the exposed wall.

Personnel

C. P. Hegan is president of Kentucky Light Aggregates, Inc. Mr. Hegan is also general manager of the Ohio River Sand Co., Inc. Philip D. Comstock and Allan P. Taylor are vice-presidents. Harry C. Aldrich is treasurer. Harry J. Mullin is the general sales manager and J. Paul Thomas, Kenlite sales manager. J. D. Duvall is plant superintendent.

Sales Engineer

GLENN E. SHERMAN has been appointed sales engineer for The Buffalo Slag Co., Inc., Buffalo, N.Y. A civil engineering graduate of the University of Detroit, Mr. Sherman was formerly an engineer for the New York State Department of Public Works in the Buffalo district.

Design Plant to RECOVER FINE SAND

American Sand & Material Co., Turner, Kan., moves plant out of flooded area and installs new equipment to recover fine sand to meet new specifications

By TIP BROWN

Close-up view showing scalping tanks and screw washers

KAW RIVER, which meets the Missouri at Kansas City, has been for a long time both the joy and despair of communities lying in its fertile valley. Its flood record has been ancient and costly, the worst, however, having occurred in July 1951. Devastation of monumental proportions washed away rich soil and industry that stood in its path. Fortunately, the toll of human life was practically nil.

The river has yielded a sharp graded sand and gravel, free from lignite, and producing plants line its banks for many miles. The State of Kansas has participated in this industry for years, and for substantial amounts of money based on two cents per ton royalty computed from annual sales. In the Kansas City area, seven plants are in production. Most all of the plants suffered minor losses to floating equipment in the latest flood, but buildings, equipment, and stockpiles felt the full force of the calamity and extensive rehabilitation has followed.

Flood Causes Plant Removal

The disaster brought on a major undertaking by the Santa Fe railway in the building of a new high line of track above the crest of the floor between Turner and Holliday, Kan., a distance of seven miles. The project cost $2,800,000. The railroad has one track now which is expected to be serviceable regardless of high water and four tracks at the lower level from Turner to Morris, and then two low tracks from that point to Holliday.

Caught in the changes involved in the relocation of the line, the American Sand & Material Co. at Turner was obliged to establish plant and equipment in a new location a quarter of a mile upstream. The company, which was started in 1922, had been well established in the sale of sand and gravel in a radius of 75 miles, and also had a large stock of hard building materials which were warehoused at the plant site and distributed locally. The heaviest flood losses were in these materials and in the screening, classifying and conveying equipment.

Sand goes to vibrating screen and thence to scalping tanks from which it is drawn through 12 valves to the screw washers where it washed and dewatered. From the washers the sand is moved by belt conveyors to stockpiles

Plant Operation

Changing specification conditions in the sand and gravel industry were met in the new setup. The highway departments of Kansas and Missouri had not been previously exercised over the amount of fines in the 50 and 100 mesh classifications, but recently have provided for increased fines to improve concrete mixes. The changed specifications can now be met in the regular plant production without recourse to admixtures.

The company has an electrically-operated dredge with a Diamond agitator which can produce around 250,000 tons annually. Pumping is done directly with an 8-in. heavy-duty Morris pump and transport by pipe line to Eagle Iron Works classifiers and washers. Vibrating screen equipment was furnished by the Iowa Manufacturing Co. The coarse material, ¼ to ¾ in., is diverted to a screw washer and then passed to a small vibrating screen where it is re-sized and distributed to bin storage. The commercial use of the varying sizes is for roofing and filter gravel for which there is a steady demand in the local market.

Sand passes over a vibrating screen to scalping tanks, 20 ft. long by 8 ft. wide and 6 ft. deep. It is drawn from beneath through 12 valves, then washed and dewatered by two screw washers and loaded on belt conveyors to stockpiles. Belt conveyors and frame work were supplied by Pioneer Engineering Works. Conveyors now extend for 200 ft. but will be lengthened later to 600 ft. Sand is loaded on trucks and hopper-type railroad cars. Loading equipment consists of a ¾-cu. yd. American, a ¾-cu. yd. Byers crane, and an International DTA high loader.

The new upriver plant was placed in operation in October, 1952 and produces 1200 to 1500 tons of sand and

(Continued on page 134)

Large Capacity Excavation and Haulage Units Cut Plant Operating Costs

General view of plant as seen from the feed hopper. Note how railroad track runs through center of plant below bins

Central Texas Sand and Gravel Co., Waco, Texas plant completely modernized; add new excavating and haulage equipment

By WALTER B. LENHART

ALTHOUGH NOT A LARGE OPERATION, Central Texas Sand and Gravel Co., Waco, Texas, has several features that set it apart from many of the smaller plants of the Gulf Coast and Southwest.

Among those features is that part of the operation which includes two walking Monighans at the pit, and the material handling up to and through the surge pile just ahead of the primary feeder to the plant. Two Euclid bottom-dump trucks haul material from pit to plant. General manager Burt. J. Collins aptly pointed out that the addition of these two 13-cu. yd., 175-hp., G. M. diesel-powered haulage units transformed the operation from what might be called a "way-side" operation to a permanent and economical sand and gravel operation.

Central Texas Sand and Gravel Co. is a totally owned subsidiary of Gifford-Hill & Co., Inc., but is operated as a separate and independent company. This is said to be the only operation of Gifford-Hill & Co., Inc., that is separate from the Dallas, Texas headquarters of the parent company. The operation is well known to some of the older members of the sand and gravel industry as it was formerly operated under the name of the Potts-Moore Gravel Co., and, its former president, Robert J. Potts, is a past president of the National Sand and Gravel Association. Mr. Potts is now Texas Highway Commissioner with headquarters in Austin.

Gifford-Hill took over the operation in 1945, and since then so many changes have taken place that one might say that the old plant operated by the former owner has been replaced in its entirety by a newer one. The company used to work from three pits in the area, two of these have now been abandoned and work is concentrated at the pit near the plant.

Adjacent to the old Martin Road and seven miles southeast of Waco, the company has a lease on about 1600 acres of gravel-bearing ground. The beds of gravel are rather shallow, running about 10 to 12 ft. of gravel with a similar thickness of overburden. The deposit is high in pea gravel and sand.

Excavating Equipment

A relatively sandy soil between pit and plant, plus a small amount of road maintenance with an Allis-Chalmers, Model 2 maintainer, and a D-6 Caterpillar and dozer make the Euclid haulage units an all-weather transportation system and contrasts with other operations of Gifford-Hill & Co.—such as their Seagerville plant, near Dallas, where extensive field belt conveyors are used for pit-plant transportation, and in some of their other operations where dredge pumping is practiced.

At the Waco operation one of the Monighans is a Model 3T; it has 3-cu. yd. Hendrix bucket swung from a 72-ft. boom and is powered with a D13000 Caterpillar diesel. The second walking dragline is a 2T with a 60-ft. boom and a 2½-cu. yd. bucket of the same make and similarly powered. Each unit works independently of the other, stripping gravel, loading it into haulage units and casting strippings back into the worked out portions of the

Fresh water for plant operations supplied by 75-hp., 850 g.p.m. capacity pump

Attractive, air-conditioned office building and company sign alongside highway

Left: One of the walking draglines loading large truck haulage unit. Right: Walking dragline stripping and casting back to worked out part of pit

pit. The draglines are equipped with Kohler light plants for night operation.

The bottom-dumpers on arrival at the plant dump to a two-compartment hopper. One of these hoppers serves to store excess material and as such acts as a surge pile. By the additional use of one of the company's clamshells a considerable tonnage can be stored alongside the truck hopper and reclaimed as needed. The surge pile will run the plant from two to three days. Available for building up the surge pile, reclaiming and other work about the plant, are two ¾-cu. yd. Northwest clamshells both using Owens buckets. One is powered by a D-318 Caterpillar diesel and the other has a Red Seal, Continental power unit.

Screening Plant

The flow of material is quite simple as the gravel is relatively small in size and outside of some occasional clay inclusions presents no great operating problem. Belt conveyors are used throughout, and the first unit in the plant is a 60-in. x 24-ft. wet trommel with a Robins Gyrex single-deck screen tucked away under the trommel. The vibrating screen under the trommel screens out pea gravel, for the most part, as that size of material is in excess. Material can be sent to bins or to the Robins Vibrex

James E. Jones, superintendent, to the left, and Burt J. Collins, general manager

double-deck screen that is mounted over cylindrical bins. Any clay is hand picked from the conveyor belt ahead of the final screen.

Sand passing through the outer jacket of the trommel is recovered from sand boxes that unload to ground piles with a No. 104 Northwest clamshell transferring the material to storage piles, or loading to cars as required. This unit is powered with a General Motors diesel and has a 1¼-cu. yd. Owens bucket.

Ahead of the concrete sand box is a flat ⅛-in. mesh screen and the throughs from it pass to a settling box from which mortar and masons sand is recovered. Excess sand, flowing to a cylindrical tank ahead of a 6-in. Pekor Iron Works tailings pump, is pumped to a waste pile.

The feeder under the primary hopper is simply a hard-surfaced old tail pulley mounted under the hopper which is driven from the tail pulley of the offbearing belt conveyor. It makes a simple and efficient feeder. The plant has a capacity of 1000 to 1200 cu. yd. per 10 hr. As an illustration: if 500 cu. yd. of paving material is processed, 300 tons will be sand and another 300 tons will be pea gravel which includes some ½-in. material.

Water tables in the area are not high and after the gravel has been excavated from a given area one can expect some 18 in. of water to accumulate in the pit, so to get water for the plant, two collector pumps are located at strategic points and these pump to a pool near the plant. One is a 6-in. Jaeger, gasoline-driven unit and the other a 6-in. electric unit. The pump serving the plant is an 850-g.p.m., 75-hp. Fairbanks-Morse electric unit.

The company has no trucking equipment outside of an intra-plant haul-

(Continued on page 136)

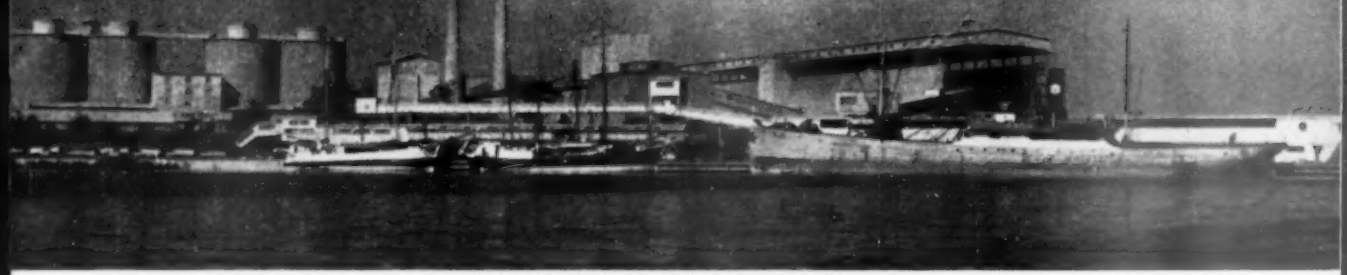
A 50-ton steam switch engine hauls hopper-bottom cars from plant to connecting rail line

Pit-to-plant haulage is done with 13-cu. yd. bottom-dump trucks

Cement

PRODUCING CLINKER

At Less Than 700,000 B.t.u. per Barrel



View of plant from harbor before building the Lepol extension

WHEN THE DECISION WAS MADE, early in 1950, to enlarge the capacity of the 2-kiln plant of Skånska Cement AB at Hellekis, Sweden, from 3800 bbl. a day by installation of a third kiln of 3000 bbl. a day capacity, the high cost of fuel made it logical to consider converting the plant from the wet to the dry process and to install a new dry process kiln. Fuel prices were three times the prewar level with little prospect of reduction —today they are five times prewar prices—and the raw materials have blending characteristics that permit use of the dry process. The first rotary kilns installed at the plant had been operated as dry process kilns from 1908 to 1931 and they had produced high quality portland cement, although then the means for preparing a blended dry raw mix were primitive.

After studying a number of continental dry process plants, particularly in Germany and Switzerland, a plant layout was selected utilizing the new double-pass Lepol type of kiln, the Swiss Holderbank (Gygi) system for conversion of the existing kilns and the Loesche type of raw mills with electric precipitators.

The double pass Lepol kiln, the first of this size ordered, was expected to be operated with an exit gas temperature of 175 deg. F. This gas, therefore, could not be further utilized. The Holderbank installations to the two existing kilns were designed for an exit gas temperature sufficiently high for drying the raw materials in the Loesche mills under normal conditions, the gas being conveyed into the raw mills through a well-insulated steel plate duct. An auxiliary hot air furnace was provided for use during the few months of the year when moisture content would be high.

With this arrangement it was possible to make effective use of this gas down to a temperature of about 175 deg. F. and at the same time collect the dust from the Holderbank kilns in the raw mill electric precipitators. Thus, this dust is mixed with the ground raw materials in the precipitators and is returned to the process.

Under most operating conditions, this arrangement would risk the building up of a concentration of alkalis and the dust from the kilns might weaken the nodules used in both types of kiln. The raw materials at this plant, however, are very easily burned (about 2480 deg. F.) and about 75 percent of the alkali remains in the clinker. Most of the rest is lost through the filter and the Lepol kiln. The material lends itself well to nodulizing and, while the dust does weaken the nodules, that effect has not caused difficulty.

Cement consumption in Sweden has been increasing very rapidly for a period of years and every plant in the country has had to operate at top capacity. It was important, therefore, to carry out the enlargement program in such a way that no capacity was lost during the building period. The new kiln with its necessary auxiliaries was first installed. During this period, the old plant operated on schedule. When the time came to start up the new kiln, the largest of the old kilns (No. 2, 2200 bbl. a day) was stopped and rebuilt. Number 1 kiln meanwhile continued to operate as a wet kiln and the new, No. 3 kiln, as a dry kiln. When kiln No. 2 was converted, it was started up as a dry kiln and kiln No. 1 was stopped for conversion. This was the situation as this article was written. Thus, during the construction period, the overall capacity of the plant successively could be increased from the original 3800 bbl.

Axial flow exhaust fan is connected to the old stack

Skanska Cement AB., Hellekis, Sweden plant converts two kilns to dry process and installs new type Lepol kiln. Exit gases from older kilns preheat raw materials which are burned at 2480 deg. F.

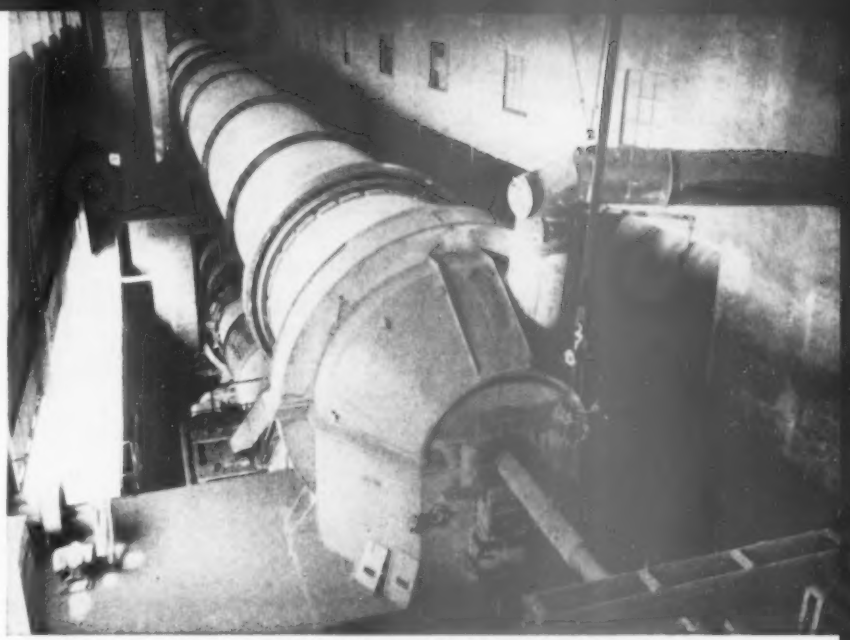
By H. SEB. THAM
and PER SYLVAN

per day to 4600 bbl. in the second stage of construction and, finally, to 6800 bbl. Actually, the capacities of the kilns have been increased well over the old figures.

Operating Results

The Lepol kiln was started in production on September 20, 1952, and, except for a few short shutdowns for adjustments, has operated continuously since. The kiln was guaranteed to produce 3000 bbl. per day with a fuel consumption, excluding the heat for coal drying, not to exceed 655,000 B.t.u. per bbl. of clinker. According to a test over a 24-hr. period, with a production of 3300 bbl. per day, the fuel consumption was 560,000 B.t.u. per bbl., the fuel used being Polish duff coal of a net heat value of 10,000 B.t.u. per lb. The average consumption over a period of months, including several shutdowns, has been about 490,000 B.t.u. per bbl., with the kiln normally producing 3400 bbl. a day. The nodules contain 12 percent water. The exit gas temperature is about 160 deg. F. and the clinker temperature at the discharge end of the rotary cooler is 430 deg. F. The cooler will be provided with two additional rows of lifters to lower this temperature.

The first Holderbank kiln (kiln No. 2) was started up on March 3, 1953.

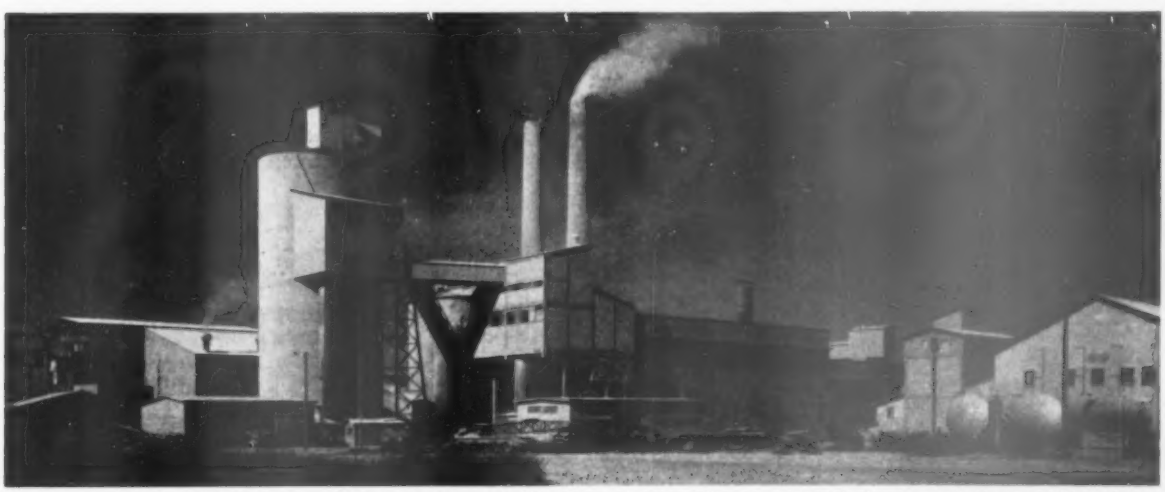


New Lepol kiln from firing end. This "double-pass" kiln differs from older types with respect to the gas flow through the grate. The grate chamber is divided into a drying zone and a hot zone so no outside cool air is used. Below may be seen the rotary cooler

For this kiln, the guarantee was production of not less than the previous capacity of 2200 bbl. per day at an exit gas temperature of 410-445 deg. F. and that the quantity of dust would not exceed 30 percent of the clinker production. In a test over a 24-hr. period, production was 2450 bbl. and the exit gas temperature was 430 deg. F. The fuel consumption was 720,000 B.t.u. per bbl. of clinker, of which some 100,000 B.t.u. was effectively utilized in the raw mills. The net fuel consumption of the kiln thus amounted to about 620,000 B.t.u. per bbl. of production. The average heat consumption over the past three months has been 750,000 B.t.u. per bbl. including the heat provided for the raw mills. This is the largest kiln thusfar to be provided with the Holderbank system.

It should be noted that the very favorable net fuel consumption for the kiln is obtainable only because of the system to utilize the exit gases for heating of the raw materials to be burned in the Lepol kiln.

Kiln No. 2 was a typical "problem child" that required constant attention by the burner. After conversion to the dry process, it has become very steady and requires very little watching. It has been proved possible to increase production substantially. When the Lepol kiln is operating and thus takes its share of the dust from the Holderbank kiln, the latter can be run at a production rate of about 2600 bbl. a day which is an increase of 18 percent. On the other hand, if the Holderbank kiln should be run independently, which is not intended, it must take all the returning dust and production drops appreciably. On one occasion the Holderbank kiln was run without any dust return in the nodules and production then was close



Cement plant after modernization. From left to right: Storage building, raw mill, raw mill storage silo with elevators, bridge to nodulizing department and Lepol kiln building. Stack, to the left, will be kept as a spare

to 3000 bbl. a day. These figures, showing the effect of the dust on kiln capacity, are still tentative but obviously the effect when using inferior raw materials could be considerable.

After completing the conversion of the remaining kiln (No. 1), it is expected that the conservative operating capacity of the plant will be around 7800 bbl. a day which is 1000 bbl., or 15 percent more than the sum of the nominal capacity of the Lepol kiln and the previous top production of the converted kilns. Of this production, the Lepol kiln will produce 3400 bbl. per day and the converted kilns will produce 4400 bbl. The overall fuel consumption for the kilns proper is expected not to exceed 630,000 B.t.u. per bbl. The total fuel for the kilns, the raw mills and the coal mills will be less than 700,000 B.t.u. per bbl.

Layout

The lay-out of the plant (page 83) is shown in an accompanying illustration. The kiln house is parallel to the storage building. The raw mill and clinker mill departments are alongside the storage building with their feeder bins inside the building. Close to the feed end of the kiln house is the raw mix storage silo and the crushing plant.

Raw Materials

The Hellekis plant is fortunate in having a practically unlimited supply of raw materials of almost ideal composition for cement production. The limestone is a Silurian, slabby stone, red in color, containing an average of 78 percent $CaCO_3$ and the necessary silica and aluminum and iron oxides. Very small quantities of other materials are required to adjust this natural cement stone. When the $CaCO_3$ content runs low, a higher grade limestone is added, and, when $CaCO_3$ runs high, a shale is used. The yearly requirement of these added materials is about 1 percent of each, the "red stone" making up 98 percent of the raw mix.

Quarrying of the red stone is complicated by the presence of many vertical cracks and the consumption of explosives is fairly high. The powder requirement is about 3 oz. per ton (short) of stone. Each shot opens up the cracks behind, thus providing openings for the escape of gases of the next shot. The rock face, varying in height from 50 to 60 ft., is drilled by a 6-in. drilling machine developed especially for this kind of rock. Burden for the holes is some 15 ft. and the spacing between holes about 15 ft. Due to the escape of gases, fragmentation of the upper ledge is inadequate although a series of supplemental 1¼-in. holes, 12 ft. deep, are grouped around the main charge and fired simultaneously. To increase fragmentation, short interval delayed action firing is used, some 15 main charges being fired at intervals of 20/1000 sec. Many ways of improving fragmentation have been and are constantly being tried, the latest being the use of 3-in. holes which are more closely spaced. So far no really good method of blasting this rather unusual rock has been found.

Until 1948 secondary reduction was done by blasting, up to 1500 shots being fired for a 16-hr. day and 10 men being continuously employed for that work. The extensive secondary breaking was required because the crusher opening was limited to pieces not to exceed 2 ft. in size. In 1948, a 2½-ton drop ball operated by an old RB 37 electric shovel was put in service and practically all secondary blasting was discontinued. The drop ball is of ordinary cast steel and the soft stone causes no appreciable wear. A discarded shovel swing roller welded to the bottom of the drop ball has proved very effective in breaking the slabby stone.

The quarry is located two miles south of and 180 ft. above the plant. Until 1947 a 3-ft. gauge railway was used for haulage. Now, 15-ton Euclid trucks are used and a 28-ft. reinforced concrete road was built for these trucks. The cost of the concrete road was justified for the following reasons:

(a) The haul being downhill and the surface smooth, the trucks were provided with a special high gear, permitting a loaded speed of 35 miles per hour.

(b) Having a good surface has made it possible to increase the load to an average of 17 tons without overloading.

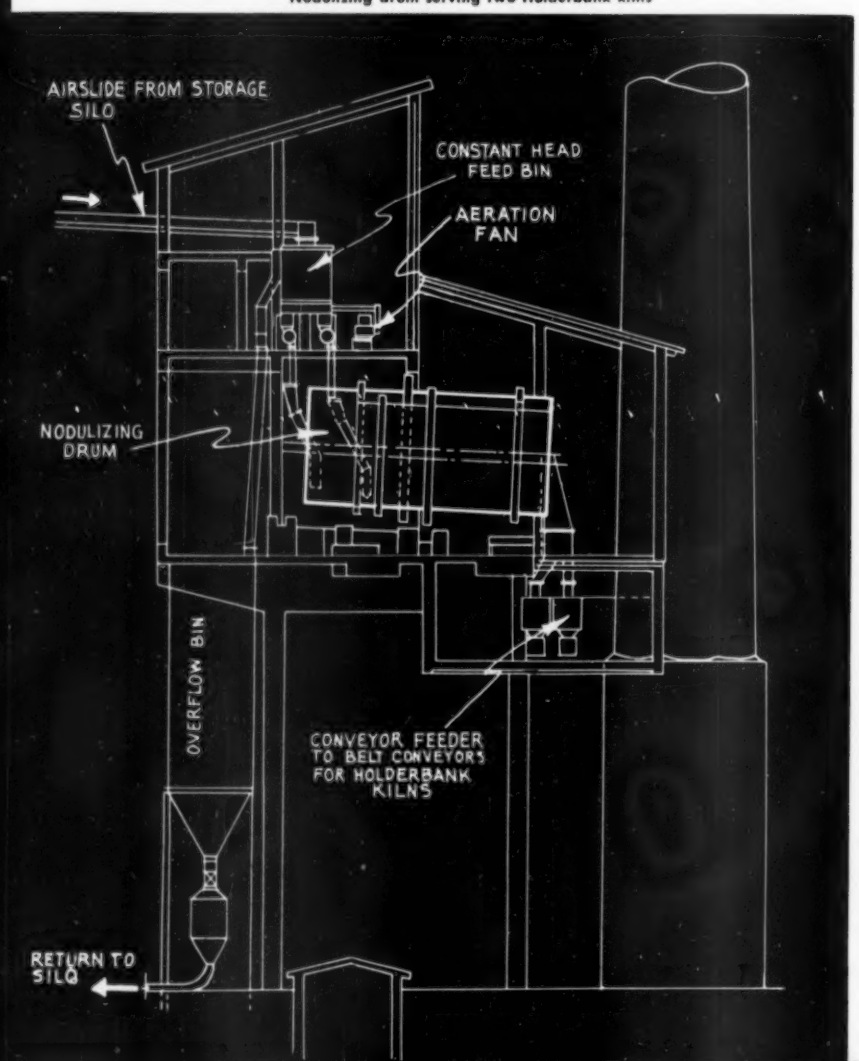
(c) The good road surface saves truck maintenance, rubber and fuel.

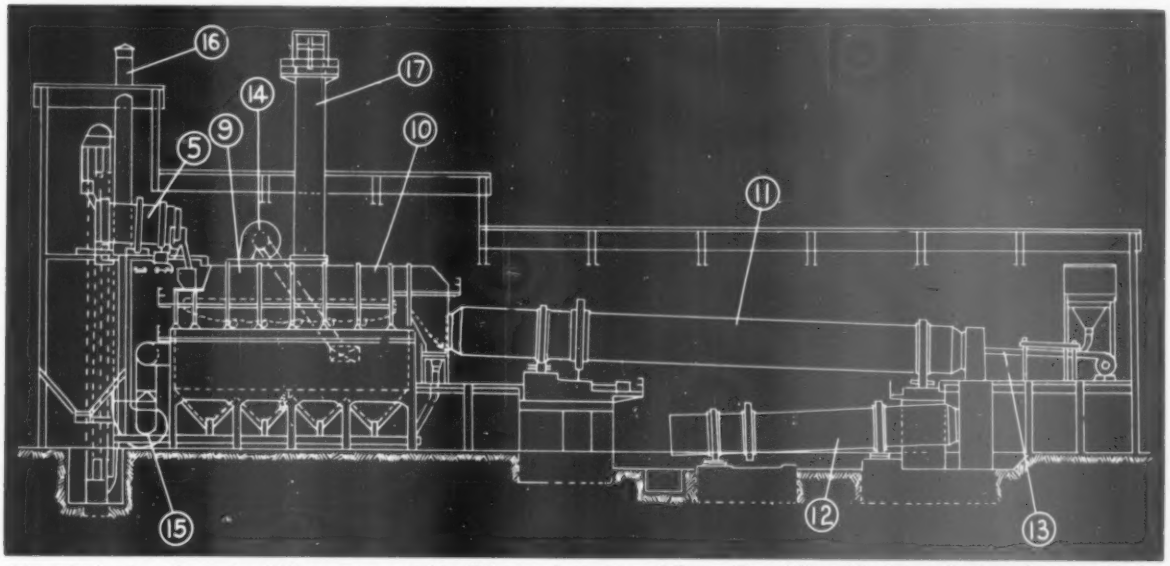
(d) The road itself is practically free of maintenance.

The trucks, now 5½ years old, have each run some 150,000 miles and still perform like new. They are serviced every three days and once a year they are taken apart and completely gone over. It should be pointed out, however, that the old-type Euclid with no rear springs is not suitable for high speed on a hard surface as oscillations are bound to develop.

The trucks are loaded by either of two 2½-cu. yd. Marion shovels with Ward-Leonard control. One is a spare. It can be argued that these shovels are too small, but with a long haul

Nodulizing drum serving two Holderbank kilns





Schematic drawing of new Lepol kiln arrangement. Identifying numbers are as follows: (5) nodulizer, (9) drying chamber of grate, (10) hot chamber of grate, (11) rotary kiln, (12) rotary cooler, (13) burner pipe, (14) exhaust fan No. 1, (15) exhaust fan No. 2, (16) stack, and (17) auxiliary stack

the advantage of a larger shovel is too small to make it economical.

Each truck makes 20 round trips in 8 hours, hauling 340 tons. They have been operating two shifts but at present, due to the increased requirements of the plant, are operating three shifts. Two 20-ton trucks will be added to the present fleet of four trucks to handle the increased requirements.

Removal of overburden, about 50,000 cu. yd. a year, is handled by a 1½-cu. yd. P and H diesel-powered shovel loading into Euclid trucks.

The changeover to truck haulage has proved decidedly economical and very flexible and has made possible much more efficiency in the quarry. Before introducing the drop ball and truck haulage, some 60 men were required, working two shifts, for the quarry and haulage. Now only 24 men are required.

Crushing

An F. L. Smidth double-shaft hammermill crushes stone of 2-ft. maximum size to minus 1 in. The stone is easily crushed and contains no hard or abrasive particles. Repair and maintenance, therefore, are low. This mill was installed 22 years ago to produce 70 t.p.h. By various changes including increasing the speed from 235 to 270 r.p.m. and providing larger motors, production has been increased to 120 t.p.h. This large capacity is of course possible, due to the softness of the stone. A small apron feeder is used and the crushed stone is delivered on a belt conveyor to the storage building.

A new crusher plant is needed for the enlarged plant. A thorough study has been made of crushing plants and the conclusion was reached that the hammermill is still the best solution for our type of stone. It has only one draw-back, and that is clogging during periods of heavy rains and snow.

Left: Secondary breaking is accomplished by a 2½-ton drop ball swung from an electric shovel. The many vertical cracks in the stone deposit which complicate blasting are clearly visible. Right: A 2½-cu. yd. shovel is shown loading 15 tons of limestone into truck

A high-grade concrete road was built for the two-mile haul by truck from quarry to plant

It is planned to install a very large, single-shaft hammermill capable of receiving the size of rock loaded by the 2½-cu. yd. shovels and to use 2-in. openings between the grate bars. By screening off the minus ¾-in. size and returning the balance in closed circuit to the mill it is believed that clogging will be eliminated and that a simple and economical solution will result. It is further planned to use an open surge stockpile, the crushed stone to be conveyed from the pile through a tunnel on a belt conveyor directly to the raw mill bins.

The existing hammermill will be kept as a spare and to crush the small required amounts of high grade stone and shale.

Raw Material Storage

The storage building is 600 ft. long with a span of 80 ft. and is served by two travelling cranes with 3½-cu. yd. buckets. One crane is sufficient except when ships deliver 1500 to 2000 ton loads of coal to the plant. Coal and gypsum are unloaded by a harbor crane to a belt conveyor that takes the material either directly to the storage building or to open storage. After completion of the new crusher plant, all "red stone" will go to the stockpile and the storage building will then hold 15,000 tons of coal, 35,000 tons of clinker, 3000 tons of gypsum and 2000 tons of both shale and high grade stone.

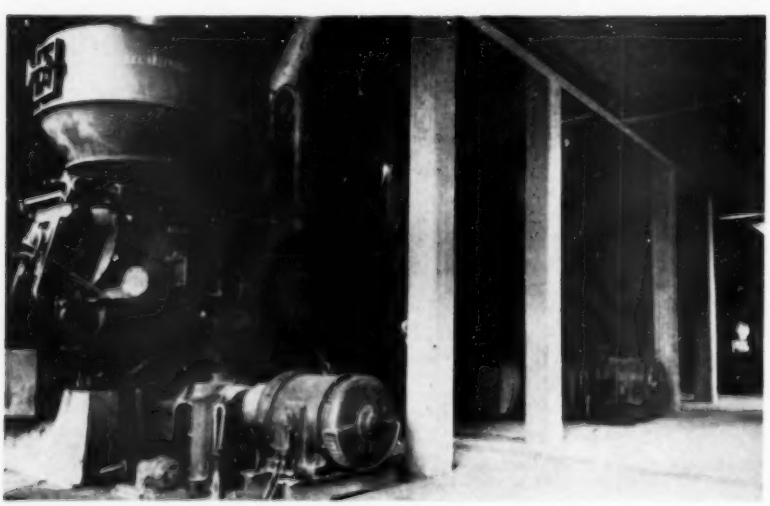
Raw Grinding

For grinding and drying the raw materials, three No. 16 Loesche mills have been installed in a new raw mill department. This type of mill can be described as an airswept pan mill. Around the revolving pan or table the hot air used for drying and sweeping the ground material through is pulled at high velocity through a slot between the table and the housing. The air draws the material through a revolving air separator above the mill which separates and returns oversize to the mill table feeder. Each mill has an Elex electric precipitator in which the raw mill production is collected, the air exhausting into the open.

Each mill has three feed bins, for "red stone," high grade limestone and shale. As already mentioned the red stone comprises some 98 percent of the raw mix. This stone is fed into the mill by an apron feeder, a belt conveyor with automatic scale, and a pocket feeder. The apron feeder has a variable speed drive which is automatically controlled by the mill vacuum. High grade stone and shale are fed by table feeders to a common belt conveyor discharging into the mill pocket feeder.

The mill table is 5 ft. 8 in. in diameter. The grinding rollers are 3 ft. 8 in. in diameter and have a width of 14 in. The mill motor is 430 hp., 1450 r.p.m., of the squirrel-cage type. The capacity of the mill is 30 t.p.h. at a fineness of 80 percent passing a 170-mesh sieve. Each mill requires 2600 c.f.m. of air which is drawn through the mill and the filter by a high pressure fan direct-driven by a 240-hp., 1475-r.p.m. motor. Total power consumption for the mill and fan is 12 kw.h. per ton. The wear on the mill table and rollers is negligible because of the soft material.

As we mentioned, the exhaust gases from the Holderbank kilns are used for drying the raw materials in the grinding mills, and the precipitators thus also collect the dust from these kilns. When a mill is not in operation, the exhaust gas is bypassed into the filter, the filter being designed for both operating conditions. When the mill operates, the temperature is 170 deg. F. and the solids content in the gases is 44 lb. per 1000 cu. ft. When the gas is bypassed, the temperature is 400 deg. F. and the solids amount to 6 lb. per 1000 cu. ft. For this operating condition the fan motor was designed for an alternate speed of 980 r.p.m. and 60 hp. The filters are guaranteed in both cases not to pass more than .03 lb. per 1000 cu. ft., and this guarantee has been met. Because of the increase in kiln capacity a fourth mill will have to be installed.



Three Loesche mills (air-swept pan mills) dry and grind the raw materials simultaneously. Heated air for drying and air-sweeping comprises the exit gases from Holderbank kilns

Raw Mix

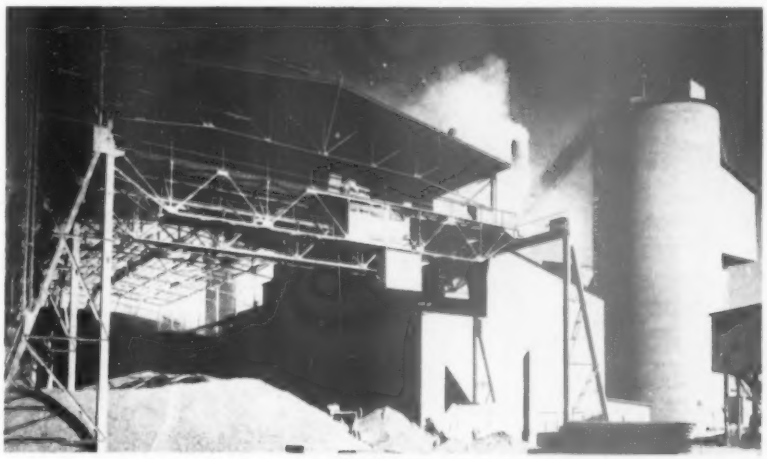
A chain conveyor in the precipitator carries the raw mix over a revolving air-lock gate to a 20-in. Polysius airslide which is common for all the mills. A second airslide serves as a spare. The raw mix is conveyed by the airslide to the four old slurry silos which were intended to be rebuilt to serve as aerated blending silos for raw mix. During the conversion period these silos could not be utilized for the purpose as they were needed for the wet process operation. However, our experience from the previous dry process plant indicated that sufficient blending would be achieved through normal handling and particularly in the new 6000-ton aer-

ated storage silo. The blending silos were temporarily bypassed and the raw mix was carried directly to the storage silo. Experience over a 9-month period has proved that the blending is perfectly satisfactory and the blending silos therefore definitely have been excluded from the program.

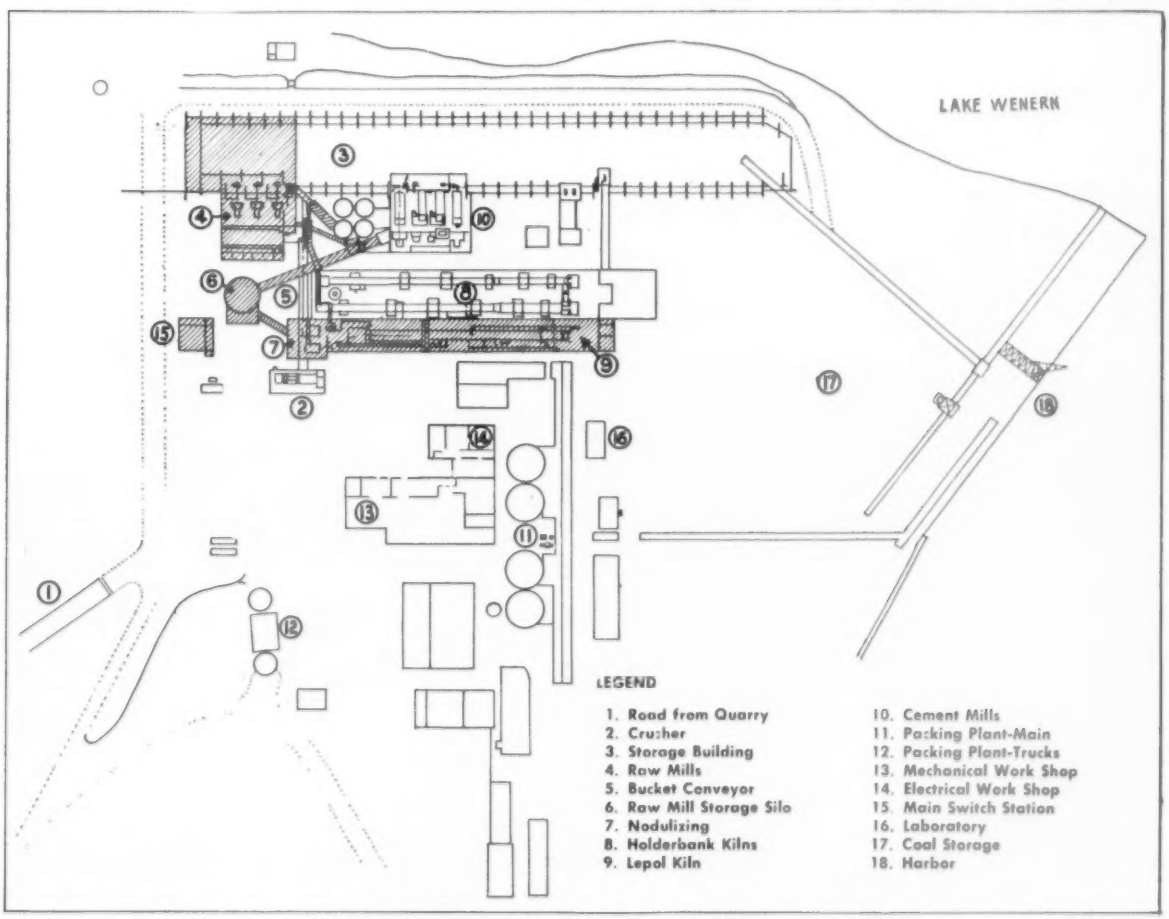
A MIAG continuous bucket elevator with roller chains built at a 45-deg. incline was installed for the delivery of the raw mix from ground level to the top of the storage silo, which is a height of some 130 ft. Pneumatic delivery would have required some 300 hp., whereas the bucket elevator is operated with 35 hp. After some early trouble with the roller bearings, the elevator now functions satisfactorily. The elevator has a width of 28 in., a total length between centers of 230 ft., a speed of 80 f.p.m., and a capacity of 110 t.p.h.

In the event the capacity of the plant be increased later, the elevator is designed to permit a speed of 120 f.p.m., thus increasing the capacity to 165 t.p.h. This would be done by substituting a 1450-r.p.m. motor for the present one which is 950 r.p.m.

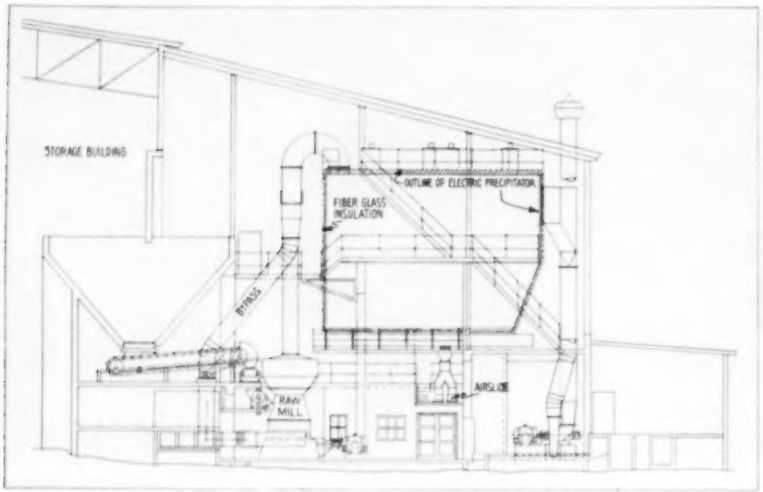
The concrete storage silo has an inside height and diameter of 118 ft. and 44 ft., respectively, and has a 12-in. wall thickness. Twenty five percent of the bottom surface is provided with Polysius aeration tile. As far as is known this is the highest aerated silo built in Europe. The raw mix is drawn off through four openings in the wall at the lowest part of the inclined silo bottom. The original discharge valves did not function properly due to the high liquid pressure, about 30 p.s.i., but the problem was solved by using an air-operated valve of our own design. Each valve is automatically controlled by top and bottom bin level indicators in a 70-cu.



Storage building, raw mill building and raw mix storage silo



Plan of Hallekis plant. New additions, including Lepol kiln, are shaded



Elevation showing one of raw mills. Exit gases from Holderbank kilns are used to dry raw materials as they are ground in the mills. Dust from the Holderbank kilns is collected in electrical precipitators so the dust is mixed with the ground raw materials in the precipitators and is so returned in the process

ft. feed bin placed next to the valve. From the feed bin the raw mix is fed through a pocket feeder to a 100-t.p.h., slow-speed, central-discharge bucket elevator. There are two elevators of 100-ft. height, one being a spare, each of which has two feed bins. The feed bins are de-aerated into the elevator shafts.

The elevators raise the material to the level of the nodulizing department and two 20-in. airslides, one of which is a spare, transfer to that department.

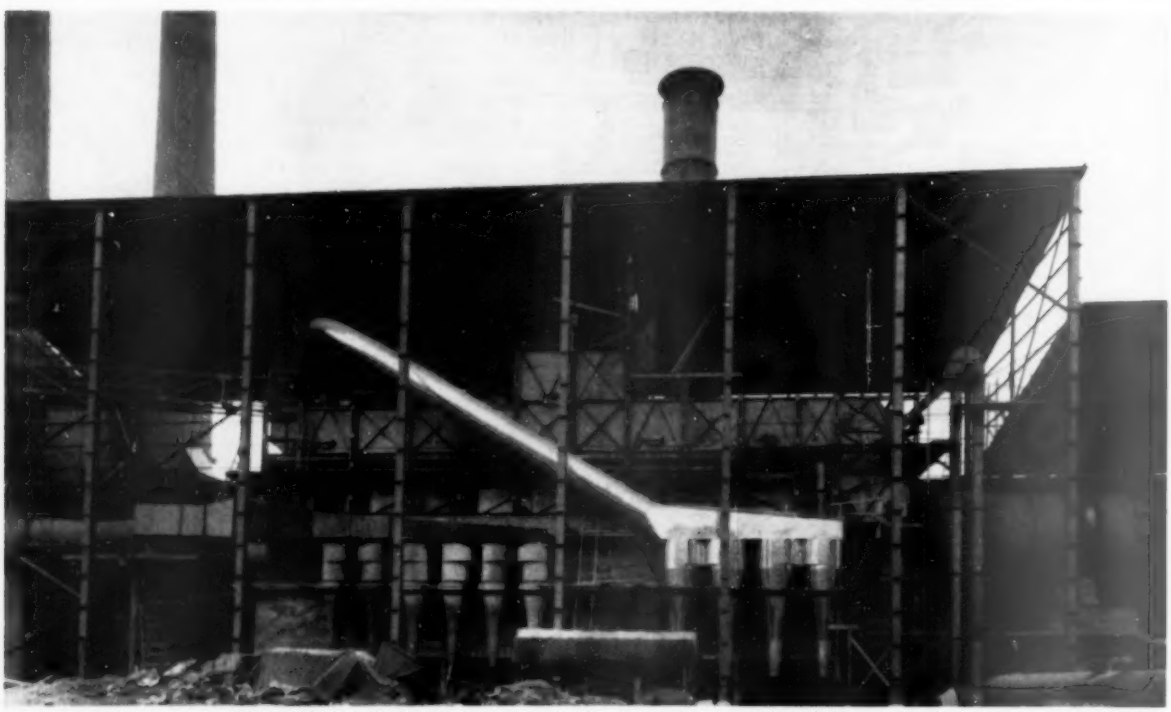
The pocket feeders to the elevators have variable speed drives remotely controlled from the nodulizing room. The aeration of the storage silo also is controlled from that location.

Nodulizing

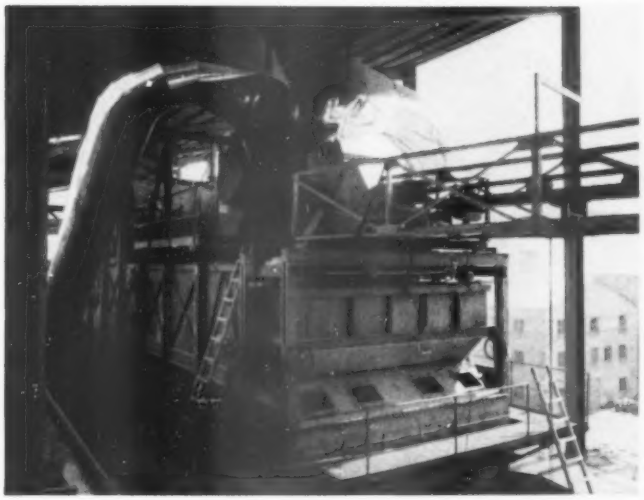
This department is located at the end of the new kiln house and houses two nodulizing drums, one for the Lepol kiln and one for the two Holderbank kilns. In normal practice the drums are placed at the ends of the kilns to be served. In this case, in order to have one common nodulizing station and one common burner station for the three kilns, belt conveyors were installed between the drums and the respective kilns. In this way only one nodulizer and one burner are required.

To facilitate nodulizing, emphasis was given to providing uniform and controllable feed of raw mix and water to the drums. For the raw mix a common constant-head feed bin with aeration tile was installed, above the drums. The bin overflow is automatically pumped back to the silo. From the bin the raw mix is fed by variable speed pocket feeders to the drums. The feed of water is kept constant by Kent air-operated flow controllers. This arrangement of equipment has proved satisfactory and the operator has no difficulty in controlling both drums.

The drum for the Lepol kiln is 20 ft. in length with a diameter of 10 ft. 6 in., and a speed of 9 r.p.m. The drum for the Holderbank kilns is 25 ft. long, the diameter is 12 ft. and the speed is 8 r.p.m. They are driven by 68- and 110-hp. motors, respectively. The speed of each drum can be adjusted to conform to changing nodulizing properties of the raw mix. The drums are provided with a set of internal knives on a slowly revolving shaft which prevent the mix from



Lepol grate, showing from right to left, kiln, feed end of grate, and exhaust gas duct into old stack. Gas passes from grate hot chamber into cyclone battery, to the right, through duct to exhaust fan No. 1 on top of grate, through grate drying chamber to axial flow fan No. 2 (not visible) into stack. Cyclone battery on the left is not connected. Auxiliary stack is used for starting up



Above: Lepol grate feed end. Bridge carries belt conveyor for nodules discharging into grate feed bin. Above may be seen two gas ducts from cyclones to exhaust fan on top of grate drying chamber. Right: Nodulizing drum for new Lepol kiln. A second drum serves the two Holderbank kilns

building up on the inside. Normal nodule size is ¼ in.-¾ in., the water content being a little over 12 percent.

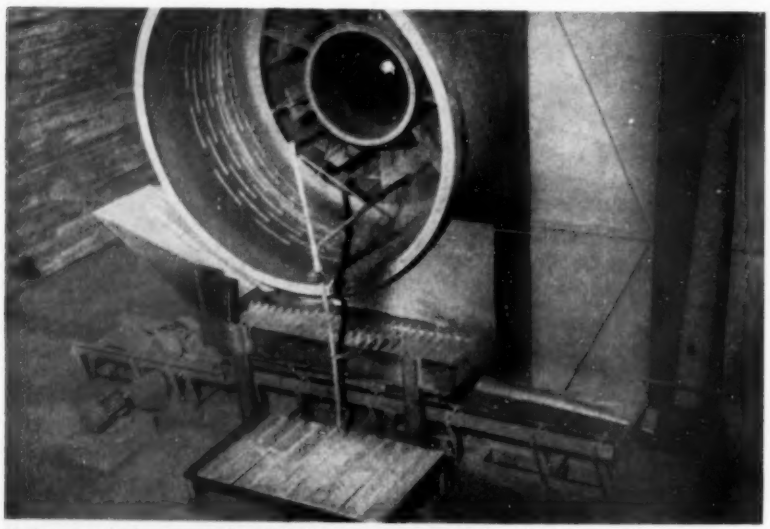
From the smaller drum, the nodules are conveyed on a 60-ft. conveyor belt located on the kiln axis to the Lepol grate feed bin. The nodule level in this bin is controlled by a semi-continuous level indicator which checks the level once every minute. When the level becomes too high or too low, the operator is warned by a signal.

The larger drum discharges into a pocket from which two conveyor feeders move the nodules to variable speed belt conveyors placed at right angles to the kilns which discharge into 12-in. kiln feed pipes. The belt conveyor speed is controlled by the burner.

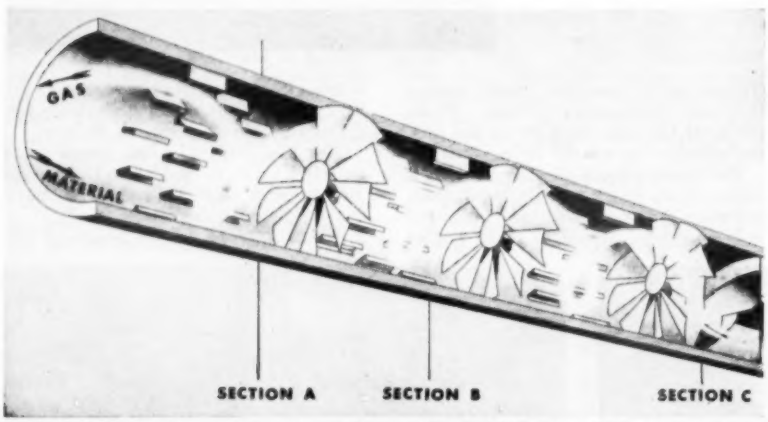
The two original kilns which were supplied by F. L. Smidth in 1929 (kiln No. 1) and 1936 (kiln No. 2) have the following dimensions:

Kiln No. 1 has a total length of 290

Left: Coal fan for Lepol kiln. At upper left is the feeder from the coal bin and behind fan is the concrete bunker for raw coal. Right: This Loesche coal mill fires the new Lepol kiln



Discharge end of rotary cooler with vibrating trough to clinker elevators. Steel rods welded to inside of drum make clinker roll instead of slide to increase effect of cooling water



Holderbank preheater system is an internal system for rapid heat transfer. This system was installed in two kilns in the conversion from wet to dry process. Four sections of these units are in each kiln, consisting of one guide wheel and four rows of lifters. Total length is 65 ft.

ft. including Unax integral cooler. Its diameter is 9 ft. 4 in. at the feed end, 8 ft. 5 in. and 10 ft. in the burning zone.

Kiln No. 2 has the same total length. Its diameter is 10 ft. 5 in. from the feed end, 9 ft., and 10 ft. in the burning zone.

Rated capacities of the kilns when delivered were 1500 and 2100 bbl. per day, respectively. In recent years the kilns had produced 1600 and 2200 bbl., respectively.

Both kilns have a 4 percent slope and are driven by 90-hp. adjustable speed motors. Normal speed is 60 r.p.h. The kiln lining is magnesite brick in the hot zone and fire clay brick (40-42 percent Al_2O_3) for the rest of the lining. For the wet process, a 15-ft. hot zone lining was sufficient and, after conversion to the dry process, 30 ft. of 6½-in. magnesite brick has been necessary. Normal life of magnesite lining has been 2 years.

After removal of the 80-ft. chain section in kiln No. 2, four sections of Holderbank units were installed, each consisting of one guide wheel and four rows of lifters as shown in one of the illustrations. The total length of the installation is 65 ft. The pressure drop in the kiln is the same as before the conversion, 1¾-in. w.g.

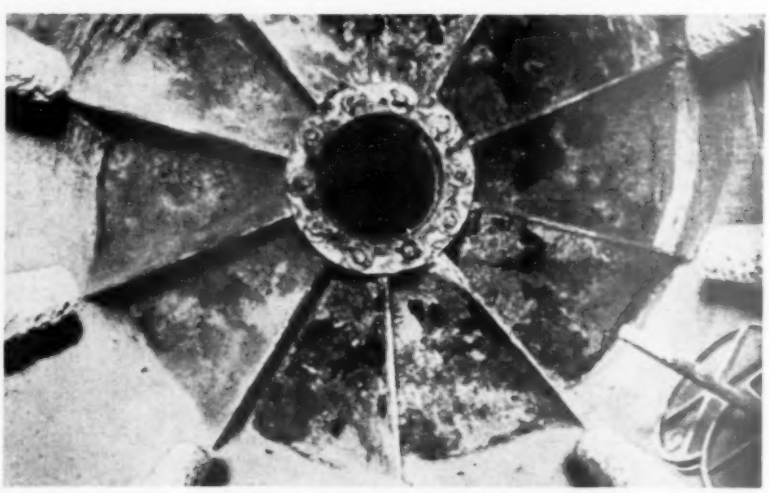
The exhaust fans are driven by 72- and 87-hp. motors. To insure prompt closure in event of electric power failure, the dampers are air-operated.

The coolers are of the F. L. Smidth planetary Unax type. To increase their cooling efficiency and to prevent overheating due to reduced flow of air as used for burning, a common fan for both kilns was installed to draw off air from the kiln hoods. Except for the heated air required in the coal mills, this air is used in the raw mills together with the exhaust gas. The temperature of the hot air is about 400 deg. F. and the extra quantity drawn off from the hood of kiln No. 2 amounts to some 5000 c.f.m.

The clinker from these kilns is transferred on a shaker conveyor through a tunnel to the storage building. Two low-speed elevators, one of which is a spare, elevate the clinker to the top of the storage area.

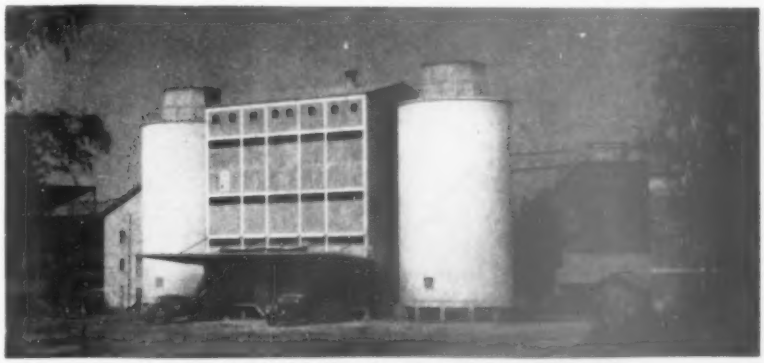
Coal Mills

Two F. L. Smidth airswept Tirax tube mills supply the pulverized coal for firing. The "semi-direct" system is used; i.e. after grinding, the coal is passed through a cyclone and collected in a feed bin. Two screw conveyors feed the coal from the bin to the burner pipe. By means of a series of screw conveyors and elevators it is also possible to convey the coal from the cyclones to two 65-ton capacity concrete storage bins and return it to the feed bins. Since the coal mills have over-capacity, it is possible to run both kilns for several days with

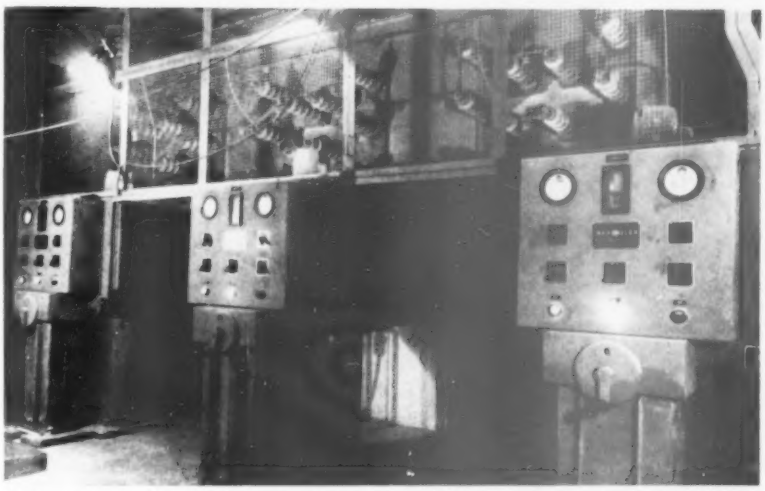


Referring to schematic sketch, this view shows middle guide wheel viewed from section (b). The lifting paddles can be seen at the circumference of the wheel

only one coal mill in operation. This is important so that either mill can be stopped for repairs without stopping clinker production. The same system was chosen for the Lepol kiln, the only difference being that a No. 9 Loesche mill was installed in place of a tube mill. This mill has a table diameter of 3 ft. The grinding wheels are 25 in. diameter and 7½ in. in width. It is driven by an 80-hp., 1400-r.p.m. motor and produces 3.5 t.p.h. Power consumption is 9 kw.h. per ton of coal, the figure for the tube mills being 18 kw.h. Due to high content of pyrite in the coal, wear on the grinding wheels is considerable. They can be used for 1000-1500 hr. and are then repaired by hard-surface welding. The cost is about the same as for the grinding balls of the tube mills. Changing wheels require 4 hr., during which time coal for the Lepol kiln is supplied from the storage bins mentioned above.



New "truck" packing plant; also used for loading bulk cement



High tension units for electrical precipitators in raw mill department. Dust from the Holderbank kilns is collected in electrical precipitators where it is mixed with ground raw materials for return into the process

Lepol Kiln

The double-pass Lepol kiln, the first of its size ordered, differs from the old type mainly with respect to the gas flow through the grate. The grate chamber is divided by a transverse wall, approximately in the middle, into a drying zone and a hot zone. In the old-type grate the kiln gases were divided between the two zones, the gas for the drying zone being diluted by cool air from outside. In the new type all the kiln gas is drawn first through the hot zone and then through the drying zone, and no outside air is used.

Referring to the schematic sketch of the kiln (see page 81), the warm gas from the kiln (11) enters the hot chamber (10), is drawn through the bed of nodules and from the grate bunker enters a battery of 8 van Tongeren cyclones (not shown), then through exhaust fan (14) and into the drying chamber (9), through the bed of wet nodules to the grate bunker and finally through exhaust fan (15) into the stack. Another battery of 16 cyclones was provided between the grate bunker and the second fan (15) but the wet granules in the drying chamber proved so effective a filter for the remaining dust in the gas that this battery was not needed. The dust content in the gas is very small and does not cause difficulty. In the first battery of cyclones about 20 tons of dust a day are collected. This dust can be returned either to the storage silo or to the kiln. The grate is 71 ft. long between shaft centers, is 12 ft. 9 in. wide and the effective area is 780 sq. ft. It is driven by an adjustable speed, 15-hp. motor and gear, the normal speed of the grate being 40 in. per min. The depth of granules on the grate is 6 to 7 in. The first exhaust fan has a 160-hp., 970-r.p.m. motor which under average conditions draws 180 amp. at 380 volts. The second exhaust fan is of the axial flow type with adjustable guide vanes and is driven by a 210-hp. motor drawing 110 amp. at 380 volts.

Internal view of a kiln with Holderbank system, showing first guide wheel viewed from section (c) in accompanying schematic sketch. The manhole cover in the center of wheel is removed

Average gas temperatures are as follows:

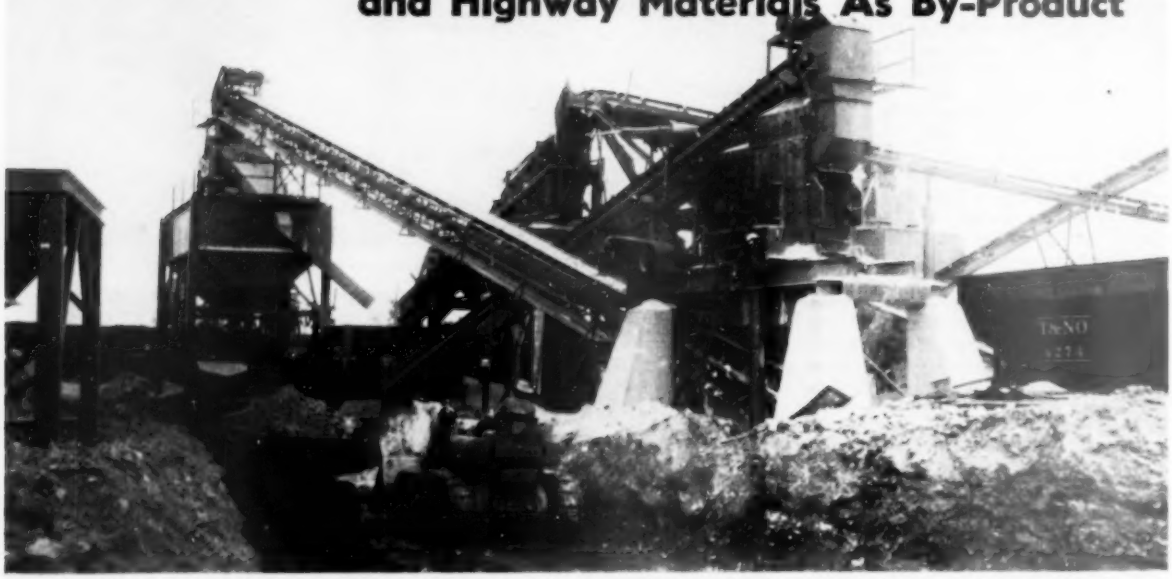
Hot chamber	1650 deg. F.
Drying chamber	500 deg. F.
Exit gas	160 deg. F.

The kiln is 158 ft. long, has a diameter of 12 ft. 6 in. and a slope of 3.5 percent. It is welded throughout

(Continued on page 124)

Produce CHEMICAL STONE

and Highway Materials As By-Product



View of crushed stone plant showing impact type crusher, to the right. This crusher is in closed circuit with the 5- x 12-ft., triple-deck vibrating screen over steel bins, to the left

By WALTER B. LENHART

ABOUT 15 miles south of San Antonio, Texas, McDonough Bros., Inc., operates a high-calcium limestone quarry. The rock is harder than most Texas limestone, and finds a large use in the rapidly expanded chemical industry to the south of San Antonio in the Corpus Christi area. Due to the quality of the stone, the plant is kept busy on specification material. The chemical stone product is mainly a plus 2½-in. minus 5-in. size. From the scalper the chemical stone is usually loaded direct to open top cars.

The plant has a capacity in the 300 to 350 t.p.h. range, depending on the sizes produced. It is of steel construction throughout, and for the most part operates dry although some stone can be rinsed. One unique feature of the operation, and the thing that sets it apart from most crushed stone operations is the use of a Universal impactor as a secondary crusher.

Impact Crusher as Secondary

During the past few years ROCK PRODUCTS has published considerable data on the use of impact-type crushers in various plants throughout the United States. However, most of these plants used the impactor as a primary unit. In such use they have high capacity and some units can receive rock up to 50-in. in diameter and in one pass reduce it to minus 3 to 4 in. At the McDonough operation a 32- x 40-in. Universal-Pettibone impactor receives the plus 5-in. rock from the scalper screen that follows the primary crusher. The impactor has three speeds so that by changing the r.p.m. of the unit, changes in the gradation can be made. This gives the plant operator a high degree of control over the gradation of the aggregates produced. Wear on the impactor is not considered high for the work it is doing. A welder spends about five hours per week rebuilding worn parts. The impactor operates in closed circuit with a 5- x 12-ft. Simplicity triple-deck screen, operated dry.

Product of the roll crusher moves by belt conveyor to triple-deck vibrating screen. Oversize goes to a hammer mill that is in closed circuit with the screen. Fines are returned to the belt conveyor from the primary crusher to obtain more fines for a "flexible base" paving material

Three-speed impact crusher. The r.p.m. determines the gradation of the product

McDonough Bros., Inc., San Antonio, Texas uses impactor secondary crusher to produce varying sizes. Independent specialty plant processes excess stone sizes

Loading in the pit is with an 80-D Northwest shovel that loads to a fleet of rear-dump Euclid trucks. Drilling is with a Bucyrus-Erie drill rig that operates above a face that is 40 to 100 ft. high. Trucks dump quarry stone to a Diamond apron feeder that supplies a 30- x 42-in. Diamond primary jaw crusher, discharging to a 24-in. belt conveyor. This belt is being replaced with one 30-in. wide as the old belt has been a "bottle neck." The new belt is expected to up plant capacity an additional 50 t.p.h. The Ingram Equipment Co. of San Antonio is supplying the new belt assembly.

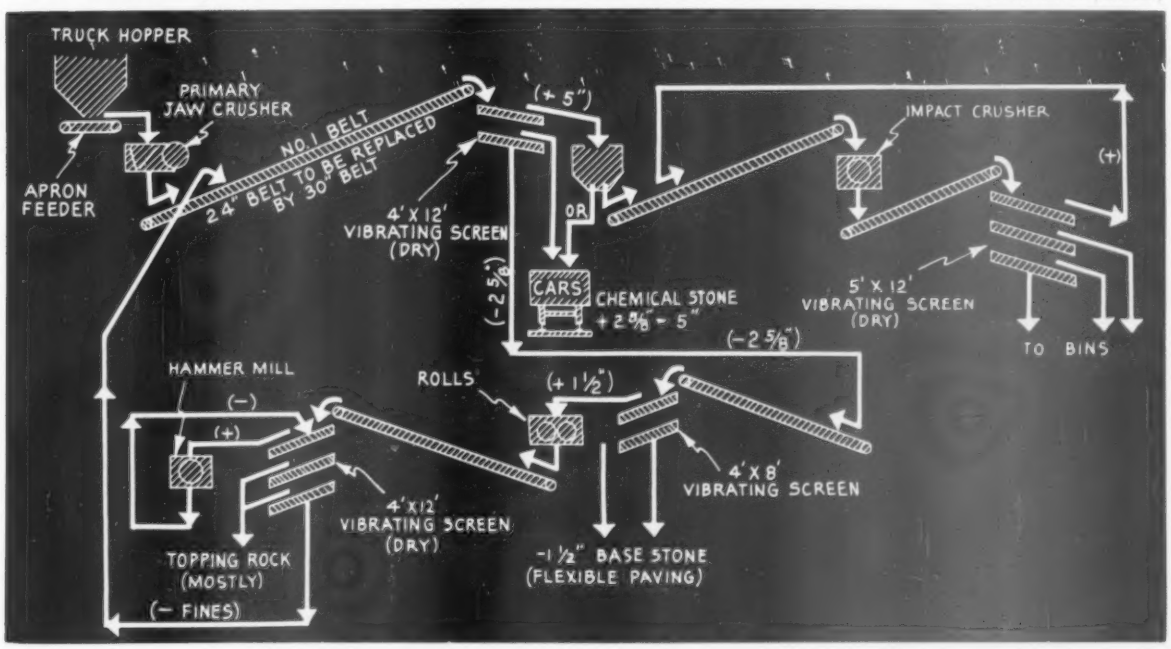
A second feature of the operation is the use of a "Specialty Plant." This consists of a truck hopper with a Syntron electric vibrator feeder that delivers to a 4- x 12-ft. Cedarapids triple-deck vibrating screen mounted over steel truck bins. On the ground and below the screen is a 20-33 Cedarapids hammer mill that operates in closed circuit with the screen. The purpose of the specialty plant is to take any excess sizes, and reduce them to the desired product without interfering with the plant's normal operation.

A third interesting feature is the flow of minus 2⅝-in. material from the Simplicity scalper screen. This is conveyed to a 4- x 8-ft. Diamond screen that takes out the minus 1½-in. flexible base rock. The plus 1½-in. from the screen goes to a set of rolls followed by a 4- x 12-ft. Cedarapids triple-deck vibrating screen. This screen prepares mostly topping rock. The plus material from this screen goes to a hammer mill, and the ham-

(Continued on page 135)

To the left is close-up of triple-deck vibrating screen in closed circuit with impact-type crusher. Conveyor at upper right is the No. 1 belt conveyor inclining up to 4- x 12-ft. scalper screen. Plus 5-in. material from the scalper goes to the impact crusher. Minus 5 in. plus 2⅝ in. goes direct to railroad cars for chemical stone. The minus 2⅝ in. is processed for aggregate

Specialty plant for any excess stone is equipped with a hammer mill and screen. It is a separate unit and does not interfere with normal operations in the main plant



Flowsheet of operations in the production of chemical limestone and road materials

ELECTRIC SYSTEM of Lehigh's Bunnell, Fla. Plant

Fig. 15: One 5 hp., type KG, 855 r.p.m., 440 volt, high torque, squirrel cage induction motor drives slurry thickener by V-belt

Latest advances in electric power distribution and control equipment installed at 4000-bbl. per day, two-kiln wet process cement plant

By AUBREY SMITH*

RECENT DEMANDS in the heavy construction field for additional types of portland cement, each with special chemical and physical qualities to give specific mechanical properties to concrete, have maintained or increased the kilowatt hours used per barrel in the modern cement plants. This is despite machine improvements which give greater mechanical efficiency such as in grinding, proportioning, pulverizing, separating, filtering, process controls, etc.

For these and other reasons the economy and practical necessity of applying the most up-to-date and efficient electric power distribution and utilization systems in a cement plant are recognized as having more importance and significance than in the past.

Freedom to plan the electric transformation, distribution, and utilization systems permitted the choice of the latest ideas for use of electric equipment in the Bunnell, Fla., plant of the Lehigh Portland Cement Co.

Power Source

Electric power for this plant is obtained from the Florida Power & Light Co. by tapping their Daytona-St. Augustine-Palatka 66 kv. network (Fig. 1). The substation and nearby tapping line is insulated at the 110 kv. level. This will minimize difficulties, such as arcovers, from dust incrustation on insulators as well as prepare for a possible increase of network voltage in the future. The 66 kv. line approaches the plant site from the windward direction (south) to minimize the cement dust factor on insulator maintenance and life.

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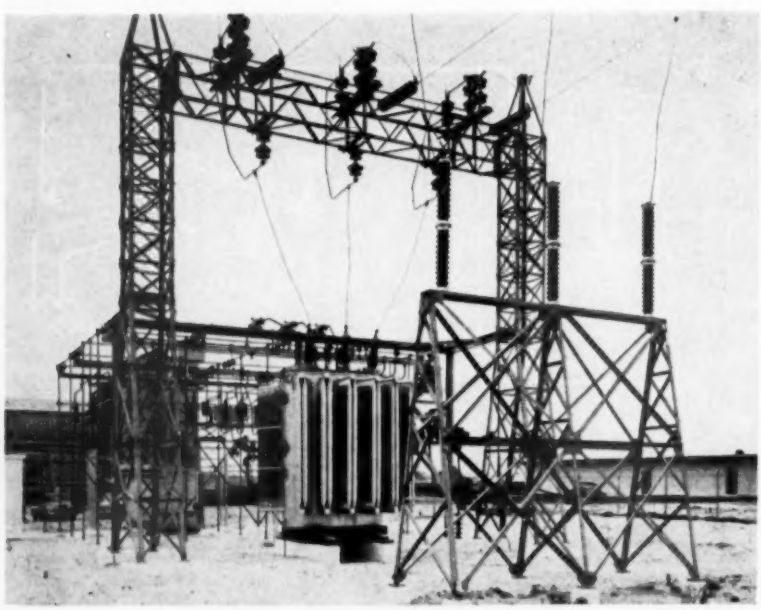


Fig. 2: Outdoor power substation, showing lightning arresters, 7500 kv.-a., 66 kv.-4.16 kv. transformer, oil circuit breaker and high speed voltage regulator

Plant Substation

The high voltage power line first connects to a set of station type lightning arresters. It then passes through a set of manual, gang-operated, disconnects atop the strain structure from which it drops to the delta-connected side (66 kv.) of the 7500 kv.-a. outdoor power transformer (Fig. 1 and 2). A triple bus outdoor structure is employed to give ample facilities for operating conditions which may be encountered and to provide for substation expansion. The transformer bus may be connected to the unregulated bus by either of two oil circuit breakers. A by-pass is provided for the voltage regulator so that it may be serviced when and if required.

The power transformer has a 4160-volt, wye-connected secondary with its neutral grounded through a 1200-amp. resistor. Operating the system with the neutral grounded results in reduced operating and maintenance costs, improved service, reliability, greater safety, and better system and equipment overcurrent protection.

Ungrounded power distribution systems are subject to extremely high transient voltages under certain conditions. These high voltages damage the insulation of the circuits and equipment, thereby causing failures of either or both. These transient voltages are greatly decreased when the system is grounded properly, thus reducing both types of failures.

Ground Fault Relaying

The power distribution system at the Bunnell plant is equipped with

Aubrey Smith

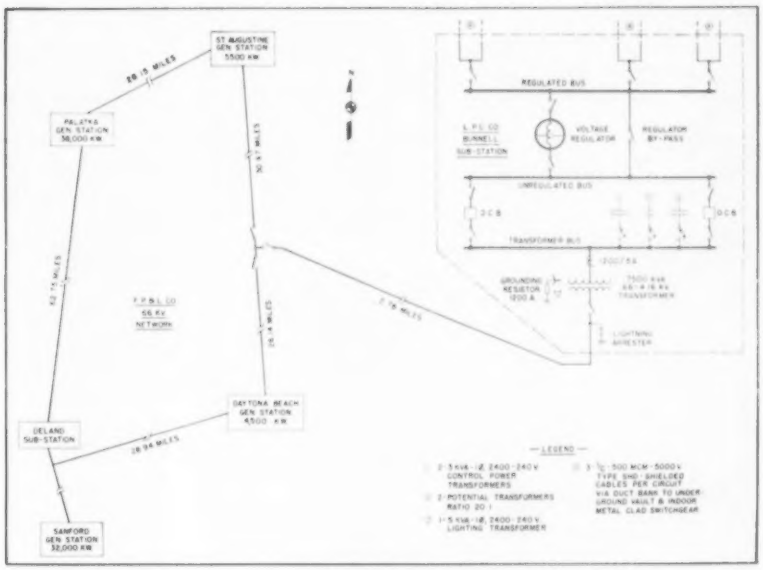


Fig. 1: Showing source of 66 kv. power supply and substation diagram

the proper relays to isolate quickly any circuit on which a ground fault occurs. This relaying, coupled with the fact that the ground fault current is limited to 1200 amp. by the neutral grounding resistor, results in minimum damage at the fault location and hence minimum down-time to repair the damage. The ground relaying is capable of tripping only the feeder on which fault has appeared and thereby reduces the time required to locate the fault. If for some reason the feeder ground relay or feeder air circuit breaker do not function, back-up relaying is provided to protect the system by tripping the incoming line circuit breakers. The faulted feeder can then be opened and the remainder of the system promptly re-energized.

Emergency Voltage Regulation

At times this part of Florida is subject to storms and/or emergency power demands which may lower the stiffness of the power source feeding the Bunnell plant. Under such conditions, the starting of one of the larger motors in the plant might produce a distributing voltage dip unless local means were taken to prevent this hazard. Therefore, starting equipment for the ball mill synchronous motors (700 hp.) is interconnected with the control circuit of a high speed voltage regulator to provide, if necessary, a boost of plant bus voltage to a predetermined value before the motor inrush occurs, thus avoiding any serious lowering of plant voltage due to this cause. The plant operator thus becomes largely independent of fluctuating voltage conditions affecting his power source due to any unusual steady-state situation.

Selection of Plant Voltages

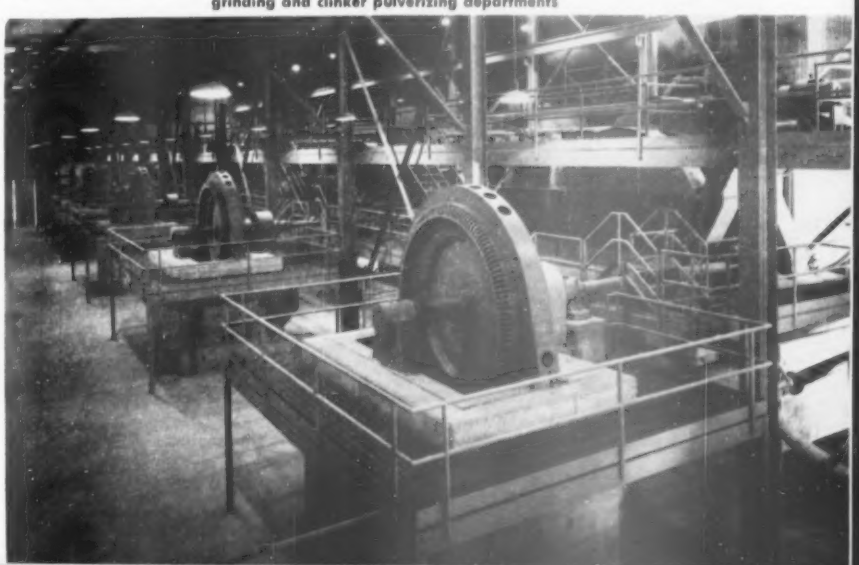
The distribution and utilization voltages for this plant were chosen to permit the most economical and simple system possible. In determining the voltages, the overall cost of the system and utilization equipment was considered, and 480 volts was selected as the most economical voltage at which to supply motors under approximately 250 hp. For the larger motors, still considering the overall system cost, 4160 volts was determined as the most economical distribution voltage. In addition to being the most economical choice, it also resulted in an electrical system which is simple to operate and is not complicated by such features as part winding starters, synchronizing buses or reactors.

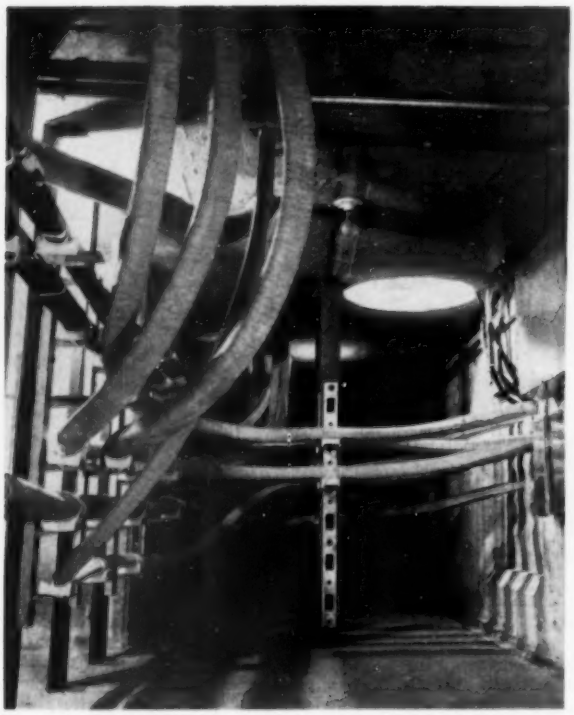
Underground High Voltage Cable Duct System

The relative location of the plant's underground duct high-voltage distribution system and the plant grounding bus, which closely parallels the duct bank system in many cases, is indicated in Fig. 3. The grounding bus serves to tie all the equipment and building grounds together, giving distinct and uniform safety advantages to both plant equipment and personnel. A total of 14 reinforced concrete underground manholes connected by 4-in. non-metallic ducts in monolithic reinforced concrete banks are the means used to distribute the 4160-volt power throughout the plant proper. The underground duct system was selected because surface transportation about the plant and between buildings (tractor-trailer haulage of raw materials for instance) would have interfered with an above-ground distribution system.

Beneath the main switchgear room and also paralleling the long line of heavy ball mill drives, the duct system manhole expands to vault size in the shape of the letter H with a double cross member, (Fig. 4). Outdoor sub-

Fig. 14: Six 700 hp., .8 p.f., 4160 volt, 180 r.p.m., synchronous motors drive ball mills in raw grinding and clinker pulverizing departments





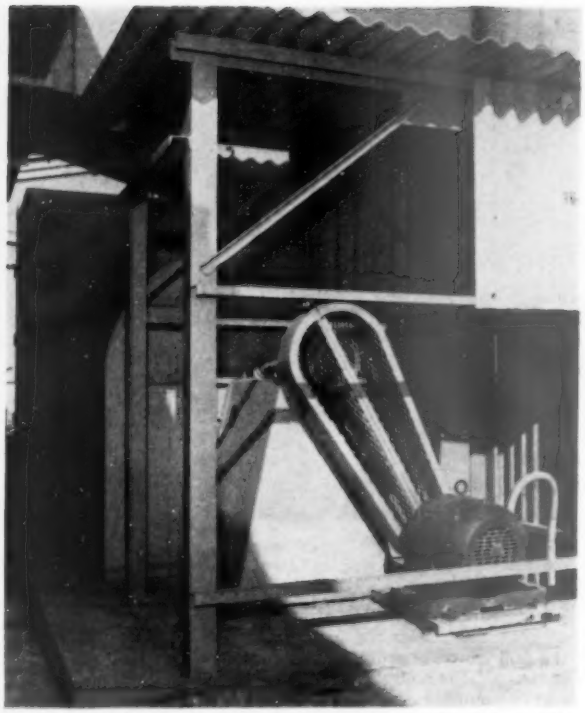


Fig. 4, left: Cable vault beneath switchgear room and heavy power area. Fig. 10: V-belt drive of one of two air filtering ventilators for switchgear room (18400 c.f.m.)

station power enters the vault (Fig. 3 and 4) over six 3-phase lines, each consisting of three single conductor, 500 MCM, type SH-D, shielded cables, grouped, wrapped and drawn through an insulated duct in the bank. Three of these lines go up through the floor to each of the two incoming circuit breakers. Spare ducts are provided in the bank from the substation so that additional circuits, if needed, can be readily pulled in. Possible cable failures are restricted from spreading to other cables by duct insulation. Any faulted, 3-phase line can be isolated and service quickly resumed.

Feeder cables from the switchgear come down into the vault, are racked

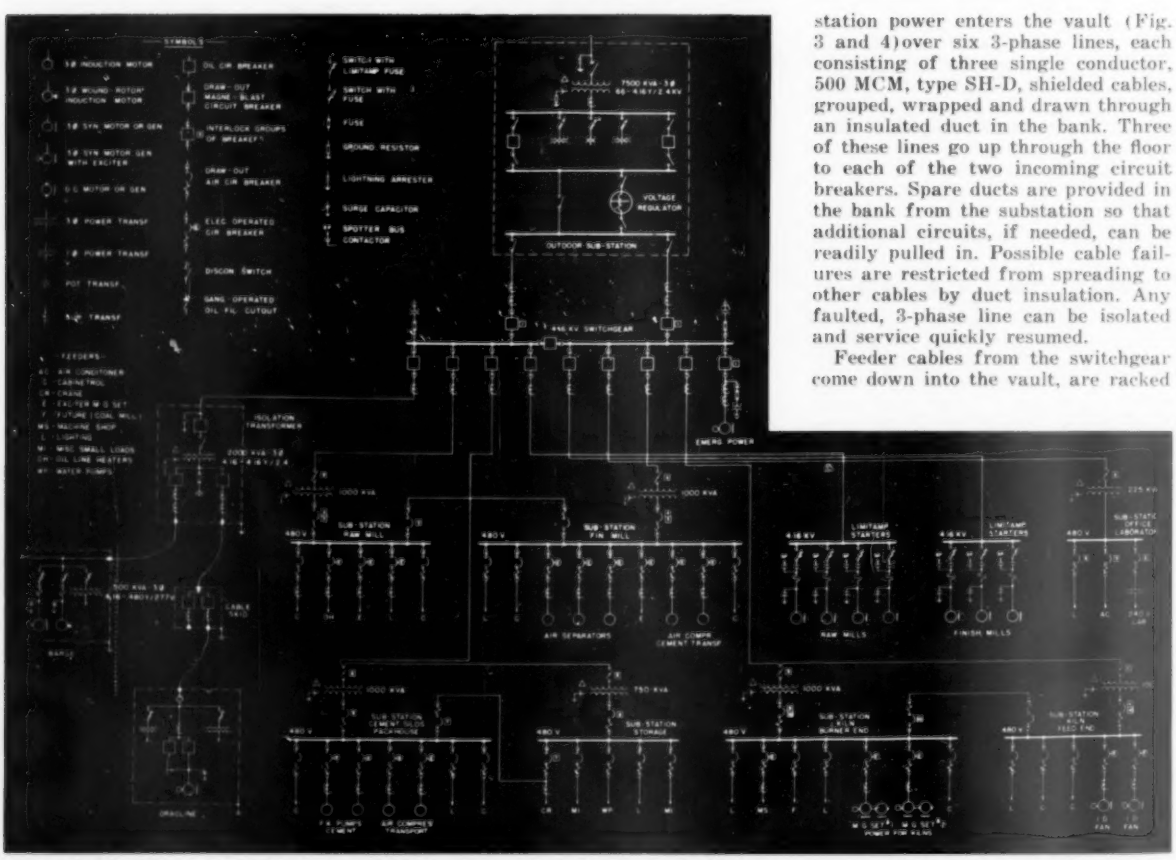


Fig. 5: One line diagram of 4160 volt plant distribution system, load center unit substations and principal 480 volt feeders to directly-controlled drives and to groups of Cabinetrol

on insulating supports, and pass through vault system to the heavy power using areas. The 4160-volt feeder lines to the eight load center unit substations located at centers of power utilization throughout the plant, and for the two groups of Limitamp* starters for ball mill motors, pass through the vault to the uptakes for their equipments, or through connecting duct banks to remote centers of power utilization.

Plant High Voltage Distribution System

The power distribution system used in the Bunnell plant is known as the radial type. It provides an economical, reliable, flexible and simple system, (Fig. 5). Load center unit substations are used throughout the plant, located at centers of power utilization, in accordance with modern concepts of industrial power distribution. For those processes which require continuity of service, a secondary tie circuit, 480 volt, to another reliable load center is provided, and so arranged that it is normally open. If trouble should occur in the load center transformer or its primary circuit, the main secondary breaker at the faulted substation would be opened and the interconnecting tie circuit closed. This permits the critical loads in both groups of feeders to receive power from the other load center unit substation up to its total short time capacity.

Three such exchanges of 480 volt power are provided in this plant. Kiln burner-end power may be secured

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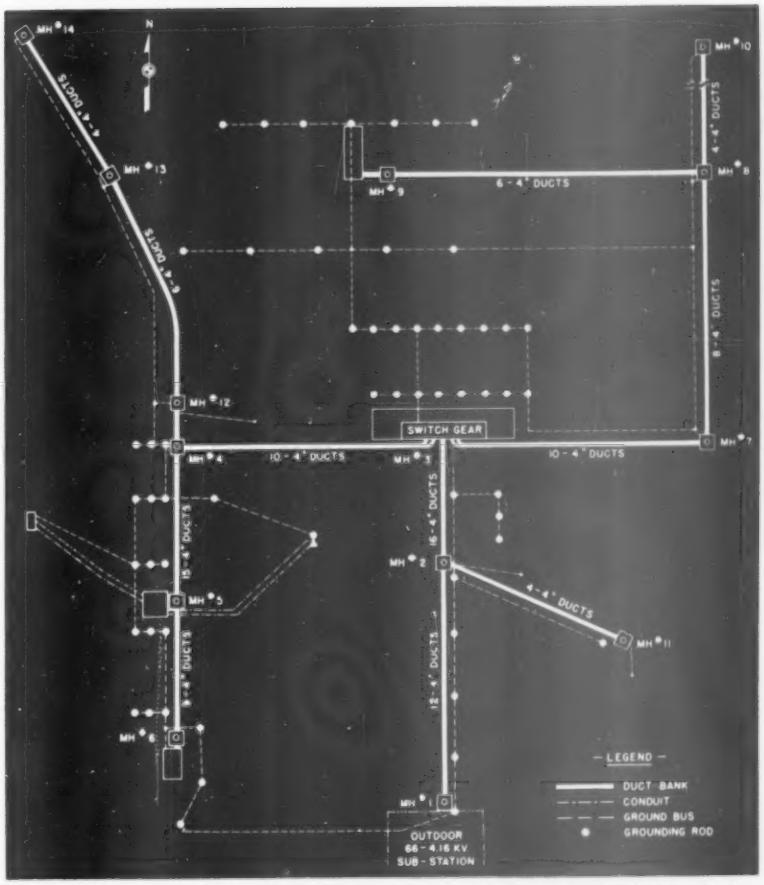


Fig. 3: Underground cable duct for 4160 volt power distribution system and plan of plant grounding bus

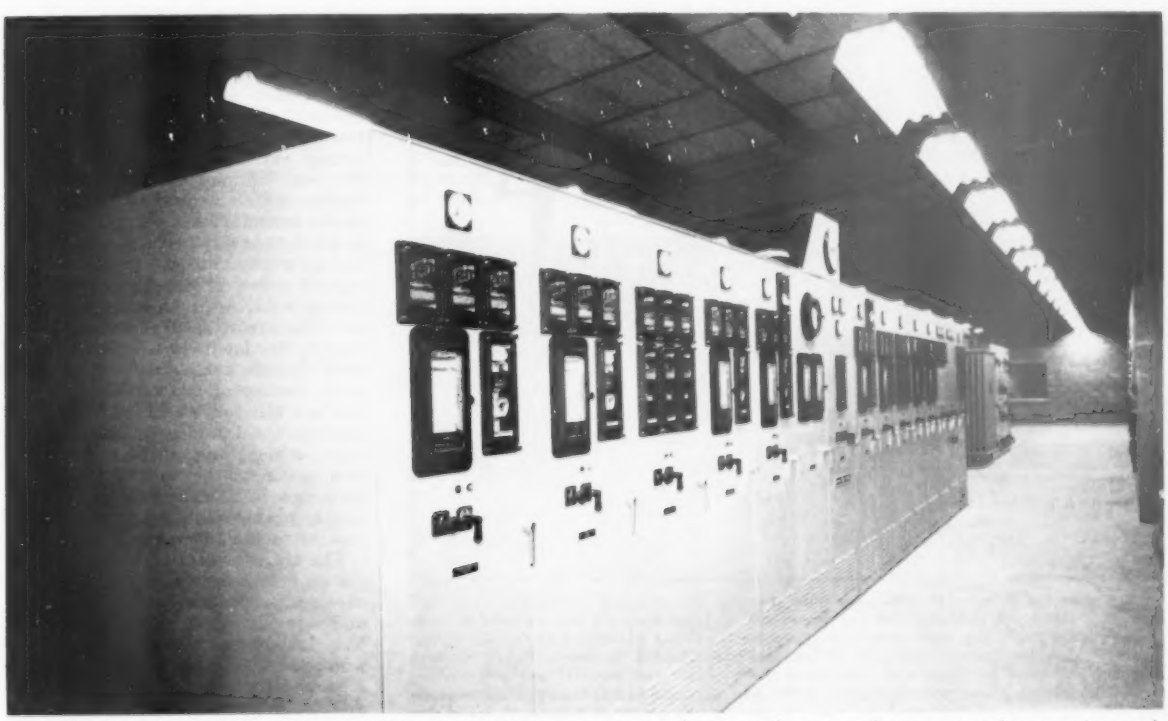


Fig. 6: The 4160 volt metalclad switchgear, including two incoming line panels, nine feeder panels, two auxiliary power and two service panels

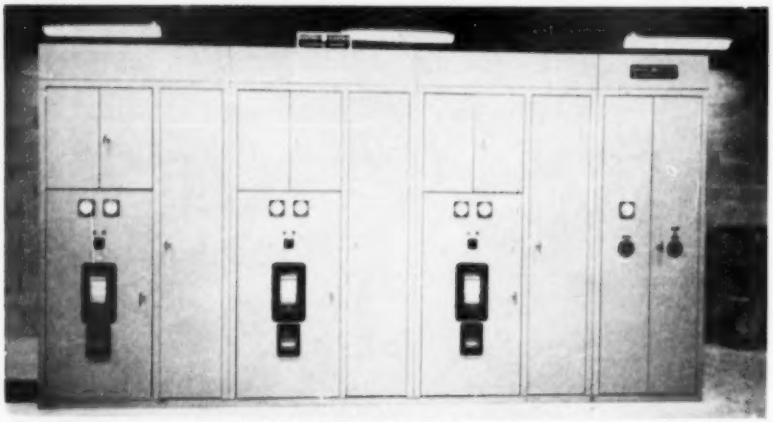


Fig. 8: Limitamp controllers for three 4000 volt, 700 hp. synchronous motors driving clinker grinding ball mills. Ball mill spotter control panel on right

from the kiln feed-end substation or vice versa. Raw grinding power may be taken from the clinker pulverizing substation or vice versa and crane power may, in emergency, be had from pack house substation. Fig. 5).

The 15-unit, metal-clad switchgear line-up is installed in a well-lighted and ventilated room above and parallel to the southern tier of the main power distribution vault. It consists of the most modern type of magne-blast air circuit breakers, rated 250 mv.-a. interrupting capacity, at 4160 volts, (Fig. 6). Foundation steelwork and grill-covered openings through the floor from the vault beneath are located at both ends of the switchgear unit to accommodate additional feeder panels as the plant grows.

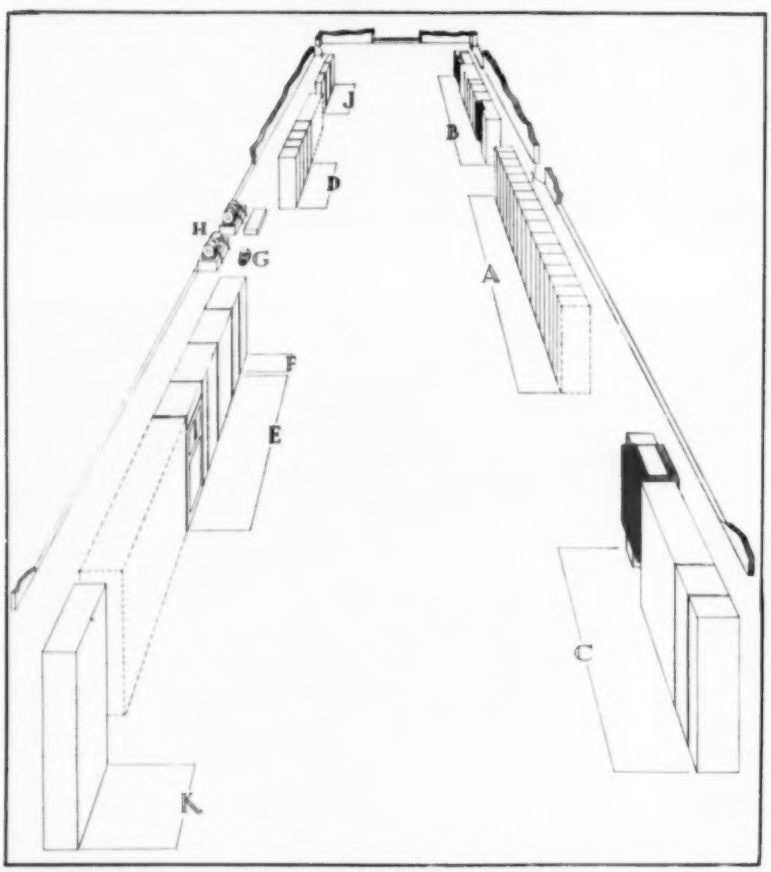


Fig. 7: Perspective drawing of switchgear room showing: (A) metalclad switchgear; (B) a 1000 kv.-a. load center unit substation for raw department (a future duplicate unit indicated in background); (C) a 1000 kv.-a. load center unit substation for clinker grinding department; (D) four Limitamp controllers for raw ball mills (future duplicate indicated by broken lines); (E) three Limitamp controllers for finish ball mills (space for duplicate indicate); (F) ball mill spotting panel; (G) spotting power generator; (H) two 75 kv.-a., 250 volt exciter induction motor-generater sets; (J) group of Cabinetrol for raw department; (K) group of Cabinetrol for clinker grinding department

Switchgear Room

The relative location of the equipment in the switchgear room may be better obtained by the perspective drawing, Fig. 7. In addition to the switchgear line-up, there are two groups of Limitamp starters (Fig. 8) for the 4000-volt ball mill motors, two 1000 kv.-a. load center unit substations (Fig. 9), each with low voltage drawout feeder air circuit breakers and d-c switchgear for the exciter m-g sets, two exciter m-g sets, two groups of Cabinetrol* for control of the low voltage motors in the raw and finish mill departments, and the ball mill spotting generator and its control panel.

Space has been left for installation of two additional load center unit substations to take care of increased raw and finish department requirements and for the additional Limitamp* controllers and Cabinetrol groups when required as the plant expands. Mounting steel for these future units is set in place with grill-covered hatches to the vault beneath or over the wiring trenches for the Cabinetrol. The duplex, face-to-face arrangement of these equipments permits maximum observation and supervision by one operator located in the center of this power control room.

Load Center Unit Substations

The typical major departmental load center unit substation at the Bunnell plant (Fig. 9) contains a 1000 kv.-a. Pyranol*-immersed transformer rated at 4160-480 volts and the required number of 480-volt drawout air circuit breaker feeders as well as the secondary disconnecting circuit breaker, type AL-2-50, and the departmental watthour meter for summarizing the power consumption of the particular department. In addition to this a-c switchgear, each of the two load centers mounted in the switchgear room include complete control equipment for one of the two 75 kw. 440-volt a-c/250 volt d-c induction motor-generator sets, also located in the room, which supply 250-volt excitation power to the ball mill synchronous motors operating nearby. These panels provide full equalizing facilities for parallel operation of the units.

The transformers in all of the load center unit substations in this plant are delta-connected on the primary and wye-connected on the secondary. The low voltage neutral is solidly grounded to obtain the benefits from a grounded neutral system as outlined

*Registered trade name of the General Electric Co.

previously for the high voltage system. In this case, since relays are not used with the low voltage air circuit breakers, it is necessary to ground solidly the transformer neutral to insure sufficient ground-fault current for fast breaker operation.

The load center unit substations are completely metal enclosed and the metal structure is grounded to the plant ground bus for safety to personnel. The use of metal enclosed equipment eliminates the necessity for a protective fence and provides a safer, dependable substation.

The radial type power distribution system with load center unit substations as used in this plant insures that electric power is distributed economically at the 4160-volt distribution voltage. At each load area the power is transformed to the utilization voltage of 480 volts by the load centers.

Ventilation

The wall grills seen over the switchgear in Fig. 9 are two of the six which admit clean air from the two 18,400 c.f.m. filtering pressure ventilators (Fig. 10). Each ventilator unit consists of a V-belt driven blower which draws air through a two-stage, continuously liquid-cleaned, vertical conveyor type filter. This reduces accumulation of dust on this all-important "heart of the plant," encourages good housekeeping, decreases maintenance activities, and assures the best of operating conditions for the accurate instrumentation required in modern cement plants. Since no machinery in the plant can operate except from power which is metered in and controlled by the switchgear room, all provisions were included which would aid in maintaining the equipment in top operating condition.

Power for Winning and Beneficiating Coquina and Sand

The plant's material flow starts with either a 10 or 12 cu. yd. dragline which dredges up a mixture of coquina, sand and soil from as far as 50 ft. below sea level. Power for this operation and for the 220 ft. long screening barge, which separates and rejects waste material from the required coquina-sand mixture, is supplied at 4160 volts from switchgear panel No. 1, (Fig. 6).

The power line follows the vault and duct bank system to manhole No. 14 (Fig. 3) and continues as three single conductor, 500 MCM, type SH-D shielded cables wrapped together to reduce impedance and laid underground to the proximity of the heavy apparatus. Because the walking dragline moves about with the barge on a pond which gradually changes shape, the end of this power line is brought above ground and carried for a short distance on portable wooden horses to the terminals of equipment mounted nearby.

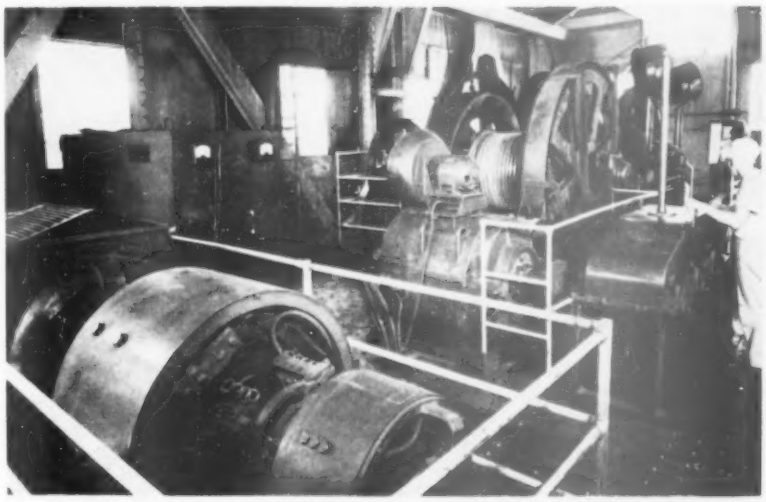


Fig. 11: The 10-cu. yd. dragline has a-c—d-c generator voltage controlled electric drives

This equipment consists of a lightning arrester, a primary outdoor oil circuit breaker, a 2000 kv.-a., 4160-4160-volt isolating transformer, and a two-circuit cable-skid with an adequate oil circuit breaker controlling each outgoing circuit. The isolating transformer has a delta-connected primary and wye-connected secondary, the neutral of which is grounded through a 50-amp. neutral grounding resistor.

The barge and dragline operating in this area are fed through plug and socket connected triple conductor portable cables from the two breaker protected circuits on the cable skid. The 2000 kv.-a. transformer isolates the barge and dragline feeders from the remainder of the plant 4160-volt system by breaking the solid electrical connection which would otherwise exist. This permits the installation of a neutral grounding resistor to limit the line-to-ground fault current at the barge and dragline to 50 amps.

A ground return circuit with a maximum of 2 ohms impedance is used to connect the grounded frames on the barge and draglines to the ground side of the neutral resistor. The combination of 50 amp. maximum ground fault current and 2 ohms maximum ground return impedance means that the maximum voltage to which personnel can be exposed in this area, when the prescribed facilities are properly installed and maintained, is 100 volts when a line-to-ground fault occurs on any of these machines. This special safety grounding system will be recognized by many cement plant operators as the arrangement which has served so well to better protect the lives of personnel working around heavy portable machinery in quarries, pits, mines, etc.

Proper relaying quickly de-energizes the feeder when a line-to-ground fault or a line-to-line fault occurs. In this way, both personnel and equipment are better protected from seri-

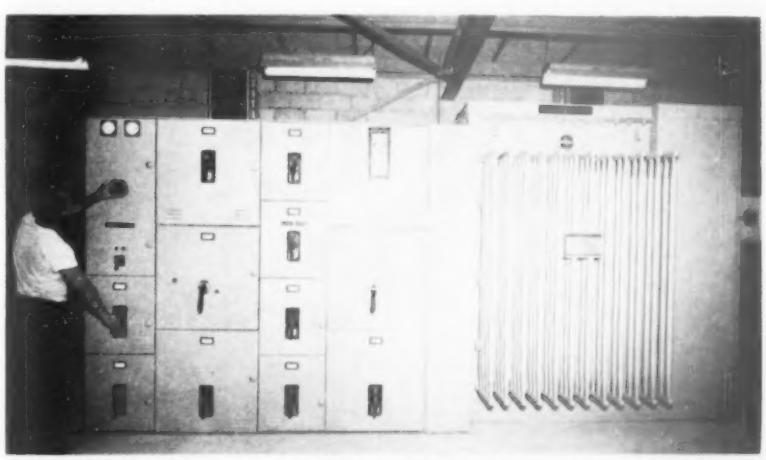


Fig. 9: A 1000 kv.-a. Pyranol immersed load center unit transformer and low voltage drawout switchgear for raw grinding department. Exciter motor-generator set control on left. Operator is adjusting voltage on exciter generator

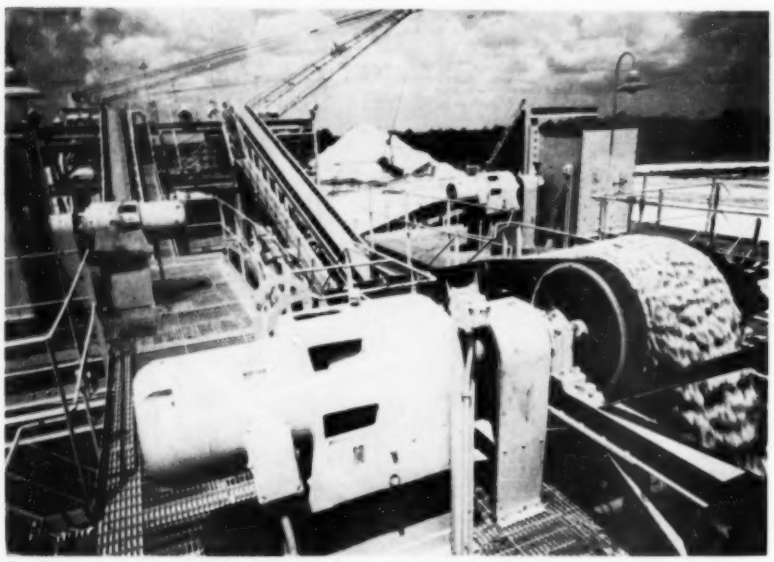


Fig. 12: Five class 3, tri-clad gear motor drives of principal belt conveyors on screening barge. The 10-cu. yd. dragline loading coquina shell may be seen in the background

ous injury from ground which may occur rather frequently around this type of heavy machinery.

Dragline Electric Drives

The sturdy electric drives of the dragline are powered at 4000 volts through a synchronous motor-driven, d-c generator set, including hoist generator, swing generator and exciter, all operating on the variable generator-voltage basis (Fig. 11).

Direct current, magnetic, three-field control equipment and accessory apparatus permit the operators a wide range of performance which is necessary for the plant production. In the extremes of this operation, the dragline power requirements will swing from about .5 leading power factor when lightly loaded to a slightly lagging power factor when heavily overloaded. The advantages of synchronous motor drive are particularly useful when it is desirable to start one of the relatively large motors on the barge, since the momentarily unloaded dragline synchronous motor can help maintain better voltage at the barge during the heavy inrush (at low power factor) of starting motor.

Electric Drives on Barge

The long boom and large bucket of the dragline deposits the raw material in the receiving hopper of the barge (Fig. 12). From there the material is removed by two reversible feeders, each powered by a 10 hp. splashproof speed variator drive with remote push button controls for both the direction of operation and the speed from 600 to 1750 r.p.m. as the rate of processing demands.

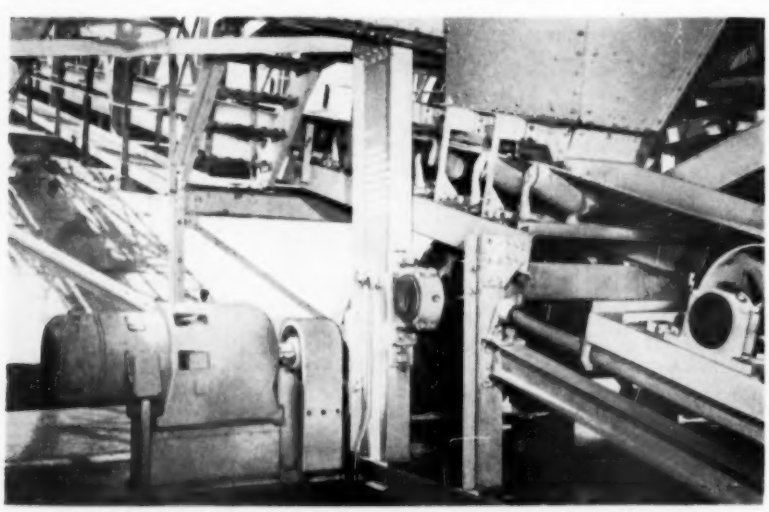


Fig. 13: Direct-coupled, class 3 tri-clad gear motor driving boom conveyor for coquina

A similar 15 hp., 1150/600 r.p.m. speed variator, remote-controlled and reversible, moves surge bin feed, at any desired speed within the range, to either of the two boom conveyors. Between these two hoppers at the extreme ends of the barge are the electric drives for conveyors, screens, etc. which serve to remove waste products such as soil and sand. The finished product is thoroughly washed before it is deposited in the final surge bin (Fig. 12).

A total of nine totally enclosed, fan-cooled, Class 3, Tri-Clad a-c gear motors, ranging in horsepower from 50 to 7.5 and in output speed from 25 to 45 r.p.m., drive through flexible-coupling conveyors handling coquina shell between the screening processes and the terminal bins.

Fourteen totally enclosed, fan cooled, Tri-Clad, a-c motors from 10 hp. to 30 hp. drive through V-belts to operate scalping and finishing screens on the barge for coquina beneficiation. Among the direct-coupled drives on the barge are an a-c driven priming pump; also four mooring winches which require 15 hp. d-c motors. The articulated parts of the output conveyors are each manipulated by boom-hoist drives requiring 10 hp., totally enclosed, non-ventilated, high-torque, 15-min. rated a-c crane motors with reversing controls.

Each of the two 36-in. coquina transporting conveyors, operating on the discharge booms of the barge, are flexible-coupling driven by a 50 hp. Tri-Clad, Class 3 induction gear motor at an output speed of 46 r.p.m. This installation (Fig. 13) illustrates the kind of service required from these sturdy drives.

Power to Barge

Power input sockets, accepting the trailing cable plugs, are installed on both sides of the barge and connected by a 4160-volt, cable-type barge-bus. They provide easy accessibility of the trailing cable to the barge, whatever its position is relative to the bank. The 4160-volt barge-bus brings power to the two large 4000-volt motors and to the barge unit-substation. One of these motors, a 500 hp. 1200/900 r.p.m. wound rotor induction type, drives the sand pump over a 25 percent speed range. The other, a 700 hp., 900 r.p.m. synchronous type, drives the water pump, providing large quantities of water required in the screening and washing process.

The 500 kv.-a., 4160-480 volt load center unit substation with secondary drawout air circuit breaker feeders and a group of Cabinetrol controllers feed power to and control practically all low voltage a-c equipment on the barge, including the a-c/d-c power units for the speed variators and lighting transformers. A motor-generator set is provided to supply d-c power to the winches which are used to move and moor the barge.

Fig. 16, left: Group of cabinetrol for raw department controls 480-volt motors. Fig. 17, right: Process controlling panel for raw grinding and blending, mounted in raw mill

In case of power failure, a gasoline-engine driven d-c generator supplies emergency power to the winch motors and certain critical lighting circuits. This completes a system which gives a more reliable and flexible power source for the nearly 2000 rated hp. of this floating screening plant.

Coquina to Storage

A 75-hp. Tri-Clad induction gear motor driven 30-in. belt conveys the coquina, from the hopper in which it is dumped by the 20 cu. yd. diesel driven tractor-trailers, over-head to the raw storage area in the mill proper. Two traveling cranes, each powered by four crane type ball bearing a-c motors (total 340 hp. per crane) carry coquina and clinker to storage, and into the grinding mill bins.

Raw Grinding

Three pairs of synchronized table feeders, each set driven by an adjustable speed, 1150/143 r.p.m., 5./0.6 hp. a-c/d-c speed variator unit, deliver coquina and sand from the raw mill bins to the three raw ball mills. A fourth pair of synchronized table feeders, similarly powered, deliver a mixture of coquina, sand, slag and staurolite to the tube mill (Item B, Drive Table).

Each of the grinding units (three in foreground of Fig. 14) are driven by a 700 hp., .8 p.f., 180 r.p.m., 4160-volt, 3-phase, high-torque synchronous motor, arranged for full voltage starting. Their Limitamp controllers, located in the switchgear room (similar to Fig. 8) are actuated by a push button station mounted on each motor pier.

The arrangement and interlocking is such that the operator can tell by the signal lights on the push button station when he has power and permission to start. The interlocking is arranged so that only one mill can be started at a time. Spotting of the mill for ball recharging or repairs is accomplished from the same push button station and with the same degree of individualized control.

Each of the ball mills operates in a closed circuit with a rake-bowl classifier, the bowl being driven by a 3 hp., 1750/520 r.p.m., Class 3, Tri-Clad a-c gear motor and the rake, driven by a 15 hp., 1750/640 r.p.m., Class 3, Tri-Clad a-c gear motor, both through V-belts.

A 5 hp. type KG, 855 r.p.m. a-c motor V-belt drives the 185 ft. diameter by 19 ft. deep slurry thickener unit which makes one revolution in 46 min., (Fig. 15). One of the two Cabinetrol units controlling the low voltage drives in the raw mill department is mounted in the switchgear room (Fig. 16). The mill manufacturer's special, process-controlling panel (Fig. 17), by which material flow through the grinding and raw blending process is carefully controlled by the raw mill operator, is mounted conveniently on the mill floor. Three of the speed variator power units which provide power for accurately controlled adjustable speed drives for many of the material handling processes are mounted nearby.

Slurry Blending and Storage

Three 75 hp., 1175 r.p.m. high torque, Tri-Clad induction motors, each

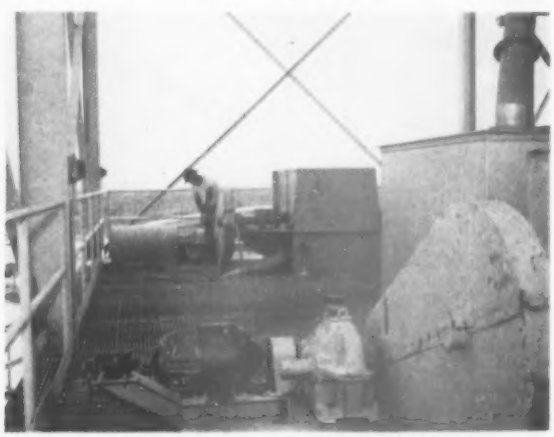


Fig. 18, left: A 125 hp. 1150 r.p.m., 230-volt d-c, tri-clad, self-ventilated, adjustable speed kiln driving motor operates through 104.5: 1 gear reducer. Fig. 19, right: Two 5 hp. 230 volt d-c adjustable speed kiln feeder driving motors with direct-connected tachometer generators arranged for speed-matching with kiln drive

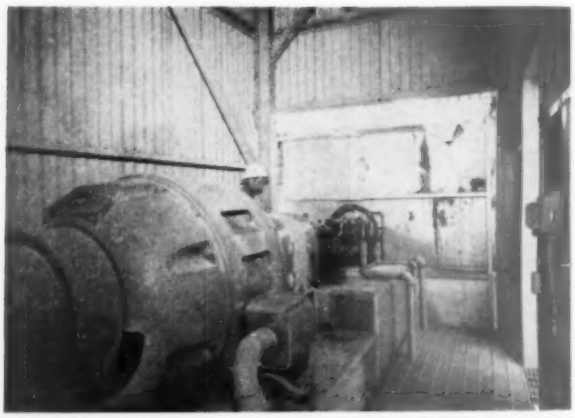


Fig. 20, left: Two 125 kw. synchronous motor driven generator sets supply adjustable voltage power to kiln drives; load center unit substation on left and magnetic d-c control panels for kiln drives in background near operator. Fig. 21, right: One of two 200 hp., .8 p.f., 1200 r.p.m. 440 volt synchronous motor drives of induced draft fans

drive through V-belts a single-stage compressor supplying air for slurry agitation by bubbling it through the blending and storage tanks. Twelve slurry pumps of various capacities, each V-belt driven by Tri-Clad induction motors, 10 hp. to 75 hp. in size move and circulate slurry about the plant and to the kilns as required.

Kiln Drives

The many operating advantages of the adjustable generator-voltage d-c scheme of driving kilns and kiln feeders are fully realized in this plant. A wide range of accurately maintained kiln speed adjustment, with close speed-matching between kiln and kiln feeder, is attained with high efficiency.

The kiln driving motor is self-ventilated and rated 40 deg. C temperature rise with constant torque output throughout its wide speed range (Fig. 18). The directly coupled tachometer generators for both the kiln motor and kiln feeder motor (Fig. 19) transmit their output to recording and indicating instruments on the kiln burner's platform.

Direct-current power for each kiln and kiln feeder drive comes from its own synchronous motor-driven generator set conveniently mounted together with its 1000 kv.-a. load center unit substation for a-c supply, in a well-ventilated room beneath the kiln drive piers (Fig. 20). The two 200 hp., .8 p.f., 440-volt synchronous motors driving kiln m-g sets and the two 200-hp., 1200 r.p.m., .8 p.f., 440-volt synchronous motors driving the kiln draft fans (Fig. 21) each have an additional function likely to prove valuable to the plant operator.

In times of a major a-c power shortage, or when production may not require operation of other larger synchronous motors in the plant, it may nevertheless be economically valuable to maintain plant power factor at near unity. These four synchronous motors, totalling 800 hp. at .8 p.f. can, when fully excited, go a long way toward accomplishing this result, therefore, contributing largely to the efficiency and power-bill savings during such partial plant operations.

For these four synchronous motors and about nine other medium capacity, low voltage drives in the plant, low voltage switchgear controls, only, are employed. They are infrequently started drives for which switchgear type control is well adapted. By this means, the purchase of duplicate industrial controlling equipments for this considerable block of power below the 4160-volt level is avoided.

The kiln manufacturer supplied a kiln control cubicle for each of the kilns. The front of the cubicle is divided into several fields. Each field contains instruments and control accessories necessary for control and interlocking of a particular group of motors. This grouping is done for the convenience of the operator.

The center field of the panel is equipped with a desk and a telephone system which enables the operator to communicate with personnel at the inlet end of the kiln. An alarm system is also mounted on the center field which provides the operator with a warning should certain phases of kiln operation be interrupted.

The cubicle is of dust-tight construction and is entered through doors at either end. Various types of recorders, including gas analysis, temperature and speed, draft, oil flow, etc. are mounted inside the cubicle. All recorders may be viewed from the outside through windows.

A 1000 kv.-a. load center unit substation is located in a ventilated concrete room beside the piers at the feed end of the kilns. It brings power economically for the low voltage motors located in this area. The load center's secondary drawout breakers together with a built-in control section supply power and control for the two draft fan synchronous motors. The Cabinetrol group (Fig. 22) which directly controls the other 15 motors in this

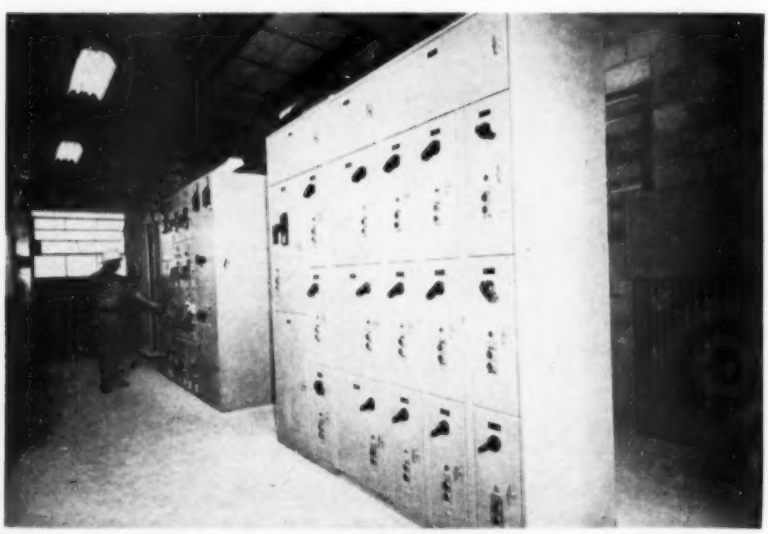
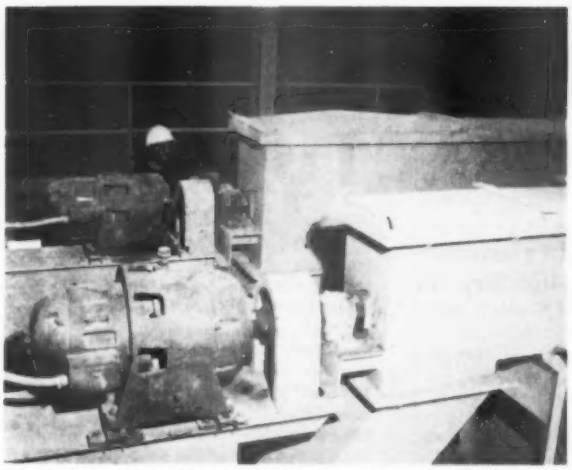


Fig. 22: Kiln feed-end power and cabinetrol center, including 1000 kv.-a. load center unit substation with operator alongside and control group for a-c motors in this area



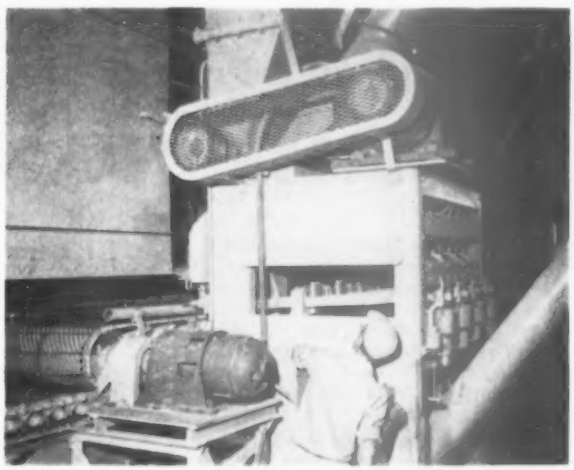


Fig. 24, left: Two tri-clad, class 3 induction gear motors (10 hp. and 20 hp.) driving cement screw conveyors at 46 r.p.m. and 68 r.p.m., respectively, in pack house. Fig. 24, right: A 5 hp., 440-volt,, tri-clad, class 3 induction gear motor drives chain belt sack conveyor on packing machine and (above) 30 hp. high-torque, 440-volt, induction motor driving cement packing machine through V-belt

area also takes its power from this load center. The low voltage switchgear of the load center includes local control of the d-c excitation generator circuits for the draft fan drives.

Important power distribution centers such as the two units connected with the kiln burning process have low-voltage tie-circuits to other load centers, permitting the essential utilization equipment they supply an alternate power source in case any difficulty occurred with either the transformer, cable or switchgear connected to the usual power source.

Automatically controlled electric heating of the oil lines transporting heavy fuel oil from the remote storage tanks to the day service tanks at the burning end of the kiln has been provided to maintain fluidity of the oil in the pipe when oil is not being pumped. Steam is used for preheating the oil when pumping from the storage tanks to the day service tanks.

TYPICAL DRIVE TABLE

Item	Driven Machine (No.)	Type	Motor HP	Connection	Speed R.P.M.
A	Table Feeders (9)	D-C Adj.	2/1.5	Direct Cpld.	2250/450
B	Table Feeders (4)	D-C Adj.	5/0.6	Direct Cpld.	1150/143
C	Feed Belts (3)	A-C Ind.	3	Gear Mot. Cpld.	25
D	Grate Coolers (2)	A-C Ind.	7.5	Chain	1155
E	Grate Coolers Fans (2)	A-C Ind.	50	Direct Cpld.	1765
F	After Cooler Fans (2)	A-C Ind.	30	Direct Cpld.	1760
G	After Cooler Drag Conv. (1)	A-C Ind.	15	Gear Mot. Chain	56
H	Cement Elevators (3)	A-C Ind.	25	Gear Mot. Cpld.	30
J	Air Separators (3)	A-C Ind.	100	Gear Mot. Cpld.	600
K	Cement Transp. Pump (1)	A-C Ind.	100	Direct Cpld.	1160
L	Cement Transp. Pump Comp. (1)	A-C Ind.	150	Direct Cpld.	575
M	Cement Screw Conv. (3)	A-C Ind.	5	Gear Mot. Cpld.	45
N	Cement Screw Conv. (3)	A-C Ind.	15	Gear Mot. Cpld.	45
O	Cement Silo Screw Conv. (4)	A-C Ind.	50	Gear Mot. Cpld.	68
P	Cement Pumps (2)	A-C Ind.	125	Direct Cpld.	1160
Q	Cement Screw Conv. (2)	A-C Ind.	10	Gear Mot. Cpld.	68
R	Cement Screw Conv. (2)	A-C Ind.	20	Gear Mot. Cpld.	68
S	Cement Elevator (1)	A-C Ind.	20	Gear Mot. Cpld.	31
T	Cement Packer Belts (3)	A-C Ind.	5	Gear Mot. Cpld.	45
V	Cement Packers (3)	A-C Ind.	30	V-belt	1165

Clinker Cooler Drives

Details of several cooler drives are given under Items D, E, F and G of the Drive Table. Item G illustrates an application of Class 3 Tri-Clad a-c gear motor through a sprocket and chain where shock loading and continuous duty demand the most reliable performance. There is no alternate exit for the hot clinker. The duplex grease and dust seals on shafts of Class 3 gear motors specified for all cement plant applications contribute to the long life of these sturdy drives.

Clinker Pulverizing

The proportioning and weighing of clinker and gypsum for normal cement and of clinker and coquina for mortar cement is all done by nine weighing-type feeders, each of which is directly coupled to an adjustable speed d-c 2/1½-hp., 2250/450 r.p.m. speed variator motor (Item A, Drive Table). The three feeder belt conveyors handling proportioned material to the three finish mills are each directly coupled to and driven by 3 hp. 1750/25 r.p.m., Class 3, Tri-Clad, a-c gear motors (Item C). Each of the three cement elevators, transporting cement from the mills, is driven through flexible couplings by 25 hp., 1750/30 r.p.m., Class 3, Tri-Clad a-c gear motors (Item H). The air separators are driven similarly by 100 hp., 1765/600 r.p.m., Class 3, Tri-Clad a-c gear motors (Item J), direct-controlled by low voltage switchgear. In like fashion, the 100 hp. 1160 r.p.m. cement pump motor (Item K) and the 150 hp. 575 r.p.m., air compressor motor (Item L) are controlled by low voltage switchgear in the switchgear room.

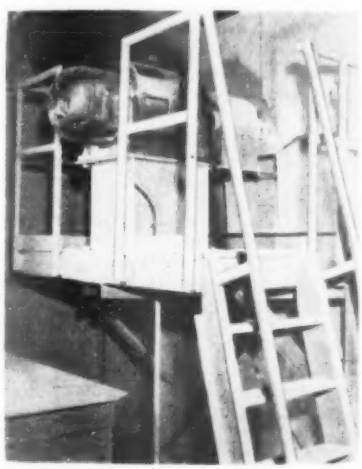


Fig. 23: A 20 hp., 440 volt, 31 r.p.m., class 3 tri-clad gear motor driving cement elevator in pack house

The three clinker pulverizer mill motors are exact duplicate drives of those used on the raw grinding ball mills (in background of Fig. 14).

Three 5 hp. 1750/45 r.p.m. (Item M) and three 15 hp. 1750/45 r.p.m. Tri-Clad, Class 3, a-c gear motors (Item N) drive screw conveyors to elevators.

Packing and Shipping

Four 50 hp., 1765/68 r.p.m., Class 3, Tri-Clad a-c gear motors drive conveyors under silos (Item O). Two 125 hp., 1160 r.p.m., Tri-Clad a-c motors drive cement pumps and two 150 hp. 575 r.p.m., Tri-Clad a-c motors drive air compressors for these pumps, all used in transporting ce-

(Continued on page 126)

Theory and Practice of

LIME MANUFACTURE

Part VI. Lime kiln stone surface and its availability for heat transfer

By VICTOR J. AZBE*

IT IS NOT THE VOLUME of a kiln shaft that determines the kiln capacity, but rather the thickness of the broken solids therein, their collective surface, degree of exposure of this surface to gas flow, the rate of gas flow, the prevailing temperature difference, the heat required and the heat transmittance characteristics.

Many years ago during one of the writer's European pilgrimages when, between London and Istanbul, then called Constantinople, visiting cathedrals, museums, castles and lime kilns, he drifted into two plants which possessed perhaps the largest shaft kilns ever built. One of these was at Hermales, Belgium, and the other at Fulwell, England. Their proportions and performance were:

	Hermales	Fullwell
Capacity per day, tons	112	56
Volume of kiln shaft, cu. ft.	28,300	19,200
Shaft volume/ton lime/day, cu. ft	256	343
Area of kiln shaft, sq. ft.	540	480
Lime/Sq. Ft./day, lbs	415	234
Time of travel through kiln, days	6.1	8.2

In this country we then had kilns of a similar low rate of production, such as a rather large Pennsylvania kiln requiring 7.2 days of passage time, and some Tennessee kilns of the record length of 8.2 days.

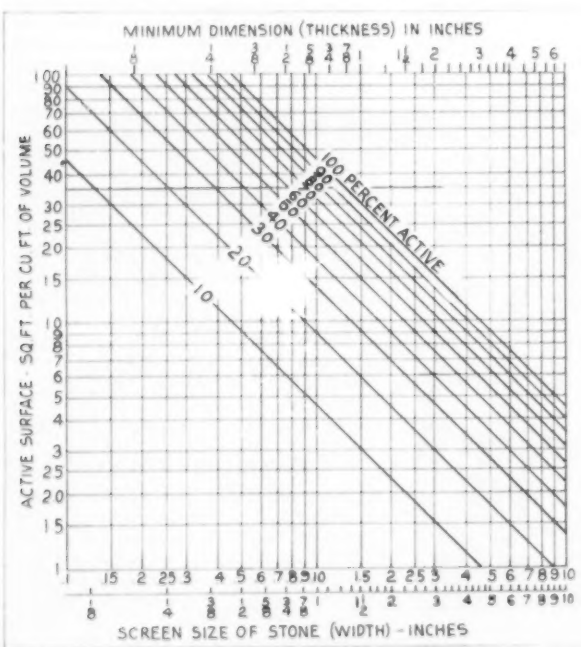
Today all this is quite different. Stone is smaller, surface is greater, and draft is stronger so a passage time of one day is common and even half a day is being attained at but 23 cu. ft. of kiln space per ton of lime with stone of 7-in. screen size, a remarkable increase! However, while there has been a great movement forward we are still only at the half way mark of that which is possible; this being kilns of less than 2 cu. ft. of volume per ton of lime, and no more than one hour of travel time.

We are not finding fault with the Fulwell and Hermales kilns. Within the economic frame of their time of 30 to 40 years ago, of their location, their initial and operating costs, they do not appear foolish at all. Then, there definitely was the question as to whether these relatively simple or the more complicated Spencer, or the still more complicated gas-fired kilns were the thing. In those days bulk did not particularly matter as construction labor and materials were low in cost. Simplicity was more important, but times have changed, and it behooves us to bring kilns up to the times.

In this we are looking back to inspire us to go forward; from the 350 cu. ft. of kiln space per ton through the 23 cu. ft. of the present toward 2 cu. ft. of the future, and from one week of kiln travel time toward only one hour. This ultimate aim of 2 cu. ft. and one hour of travel time for 1½-in. stone, while it may appear an exaggeration, is a ready possibility today, provided the surface which such stone possesses is made available and conditions in the kiln made active.

Incidentally, this time and space refers to normal stone passage in sequence through the various temperature zones. It is possible to calcine limestone much more rapidly by direct insertion in a zone of high temperature but that has little or no meaning. The problem is not only to accomplish calcination but to recover

*Azbe Corporation, St. Louis, Mo.



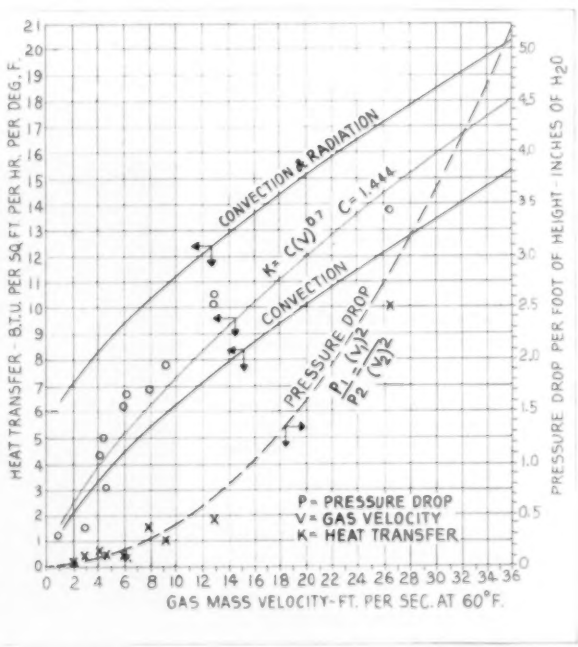


Fig. 1, left: Active kiln bed surface for varied stone sizes. Fig. 2, right: Relation of heat transfer and draft drop rate to gas mass velocity

recuperatively the sensible heat of the lime, and to cool the escaping gases by preheating the stone. In fact this is the main problem. It is not the rate of calcination, it is the efficiency of the calcination process as a whole with which we should be mainly concerned.

Comparisons With Rotary

With stone of this size many rotary kilns of today operate at 100 cu. ft. of kiln space per ton of lime produced per day, some few at 35 cu. ft. We believe that here also will be further improvement to 25 or even 20 cu. ft., but this will be about their limit. The ultimate of the rotary can never, in this one respect, even approach the possibilities of the vertical, because the surface which it contains in its charge by virtue of its operating principle, cannot be made equally available for heat transfer.

Surface in a bed of irregular broken solids is never fully active, even with stone somehow suspended so all surfaces would be exposed to the flowing heating gas, the portions past which the gas velocity would be high would receive more and possibly far more heat than such located off the stream in the flow shadow.

The exact opposite to this imaginarily suspended, fully exposed stone is the stone in the bed of the rotary kiln. Only an infinitesimal amount of this surface will be active at any one time, because there is no particular gas flow in the bed, no more than that caused by displacement due to rotation, or that caused due to exudation of CO_2, which however, is cooling rather than heating the bed.

Between the above two extremes is the surface of the stone of a vertical kiln. C. C. Furnas claims that but 10 to 20 percent of the surface which the stone possesses is active in heat transfer. This may be so when referring to directly active surface over which the gases sweep, but other portions of the surface may in other manners be active also, and the total amount is likely to be considerably more. This opinion is based on heat transfer rates actually obtained in beds of vertical kiln and of rotary kiln contact lime coolers. The deduction is that under favorable conditions of surface presentation as much as 50 percent of the total area would be active. The range may be anywhere from 10 to 60 percent, with Fig. 1 indicating what this would represent for different sizes of stone per cubic foot of kiln volume of 42.3 percent void space.

Frequently, in isolated sections of the kiln there may be no active surface. This is because it may be plugged off so there is no flow, with the main gas stream bypassing the sections with only a feeble flow or percolation therein, and a state of temperature equality. This state of temperature equilibrium is not at all uncommon in case of stagnated beds or in midsections of overly high kilns.

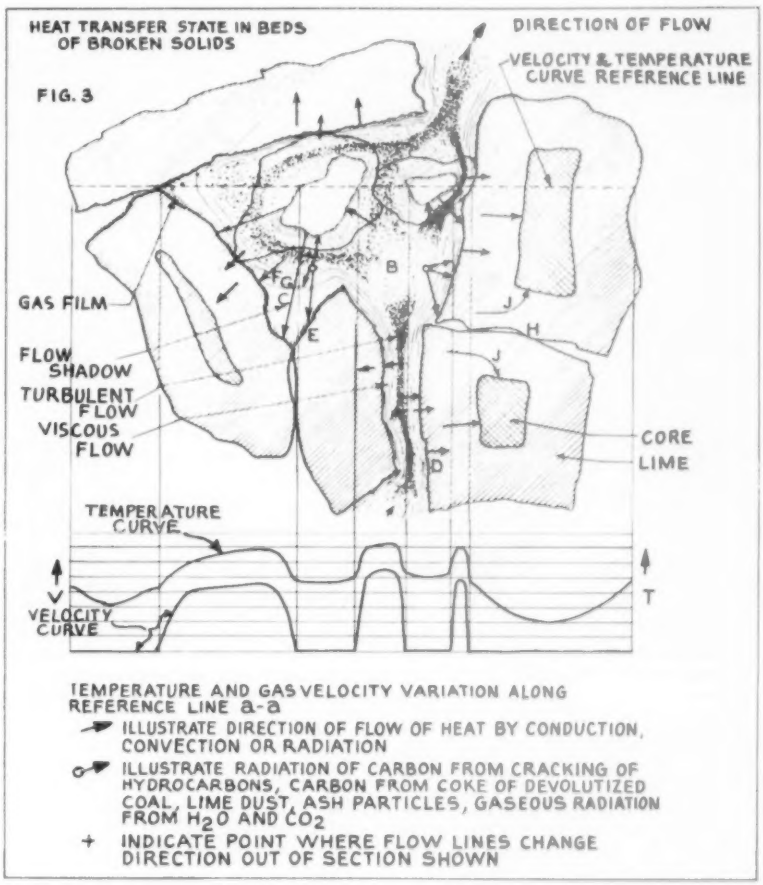


Fig. 3: Conditions in a bed with respect to surface available or unavailable to gas flow and heat transfer, representing an imaginary, vertical cross section of several pieces of calcining stone within a kiln and the interposing void

Importance of Exposed Surface

This article is not intended to deal with heat transfer or gas flow but rather surface and particularly available surface, but these three are so interwoven that the first two must also be taken into account.

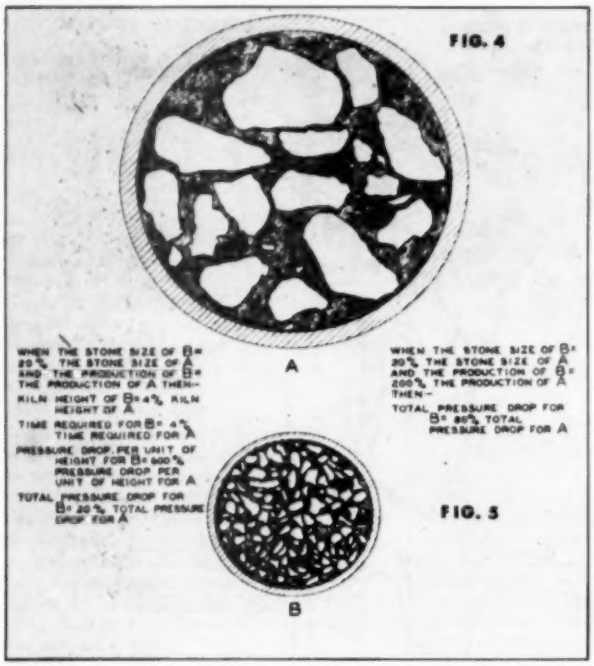
To transfer heat there must be surface, temperature difference, as radiant a state as possible, and gas flow. The flow may be a natural convection current induced by hydrostatic action due to temperature difference prevailing inside and outside the kiln. For ordinary kiln height and temperatures this may result in a draft of 0.4 in. of water gauge, which would create a good velocity in open stacks, but not in kilns charged with obstructing stone. Here the flow would be feeble and of little force for displacement of the insulating, viscous, surface layers of the gas at the lime surface which are what retards the heat transfer by convection.

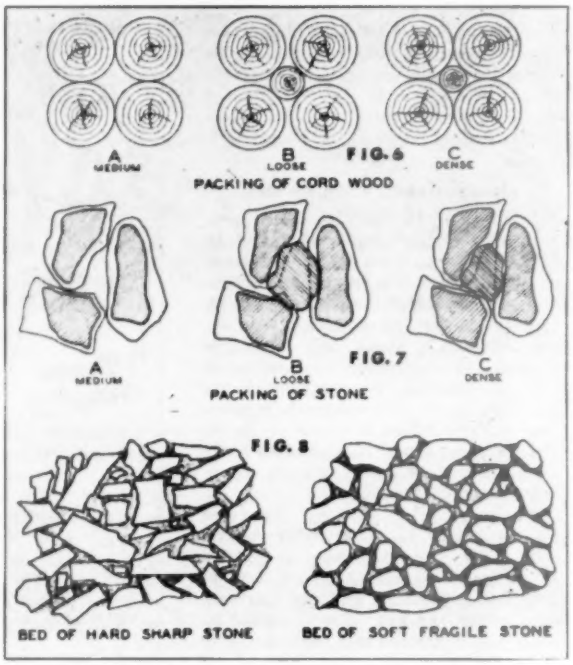
Therefore, draft fans are now almost always used. They create a pressure drop of many times the 0.4 in. and the square root of this pressure drop is the relative mass flow of the gas with respect to normal natural draft flow. For example, a fan inducing a pressure drop of 4 in. will create 3.16 times the mass flow that a natural draft of 0.4 in. will create.

With Fig. 2 we try to illustrate the relationship of gas flow, gas flow friction and heat transfer. The relationship of these is affected by many factors, what we present now is mainly illustrative, based on actual results.

One of the curves gives the convection heat transfer rate which increases with gas mass velocity but at a continually reduced rate. The position of this curve may not be entirely correct, but is reasonably so, well enough at least to illustrate the point that the convection heat transfer will raise in some such manner.

The second curve embraces both the convection and radiation transfer. This also goes up but no more than the convection heat transfer. That is the radiation heat transfer is not directly affected by gas mass velocity. It is affected by temperature and emissivity and depending on these, this curve may fall anywhere.





Left, Figs. 4 and 5: Stone bed cross sections. Right, various bed packing influences. Fig. 6: Packing of cord wood. Fig. 7: Packing of stone. Fig. 8: Bed of hard sharp stone, left, and bed of soft fragile stone, right

The two heat transfer lines may, for the above reasons, be parallel as shown, but chances are that at high gas mass velocity, kiln hot zone would extend farther, increasing the radiation heat transfer and increasing the slope of the curve and of the combined heat transfer.

The third curve shows the relation of the pressure drop to gas flow rate. It increases very rapidly, but it is this increase which increases the heat transfer, so while we call it a loss, it may not be considered a loss at all. It is a loss only when it is not applied to active surface.

Heat Transfer Calculations

On the charts there are dots representing heat transfer calculated for 50 percent surface being available and corresponding crosses representing pressure drop. The range is from less than 2 B.t.u./sq. ft./hr./deg. F., and but 0.01 in. pressure drop per ft. of column height to almost 14 B.t.u. and a pressure drop of 2.5 in. per ft. This last representing performance of a well-functioning contact lime cooler of a rotary kiln. The first would be closely representative of convection heat transfer in the rotary itself, which labors under virtually no draft drop.

The remaining dots and crosses represent vertical kilns, plainly indicating the trend of increase of heat transfer with increase of gas flow. Almost all of the dots are located above the convection line, revealing the influence of radiation transfer. The two dots that fall below the line show only that the kilns possess inactive surface.

This chart and the many more that will follow in other papers to come can be very useful through the fact that it has a fundamental theoretical background upon which practical results are superimposed. Far more useful than if but one or the other were plotted alone.

Fig. 3 was drawn to help visualize the state in a bed respecting surface available or unavailable to gas flow and heat transfer. It represents an imaginary, vertical cross-section of several pieces of calcining stone within a kiln and of the interposing void. Some of the stone is large and some is small, some is completely calcined and others still contain a core. There are sections where gas velocity is very high as "A," and others where it is sluggish as "B," or even of no flow, but for the likely convection currents such as at "C."

Along some surfaces the heat transfer is very high as "B," indicated by

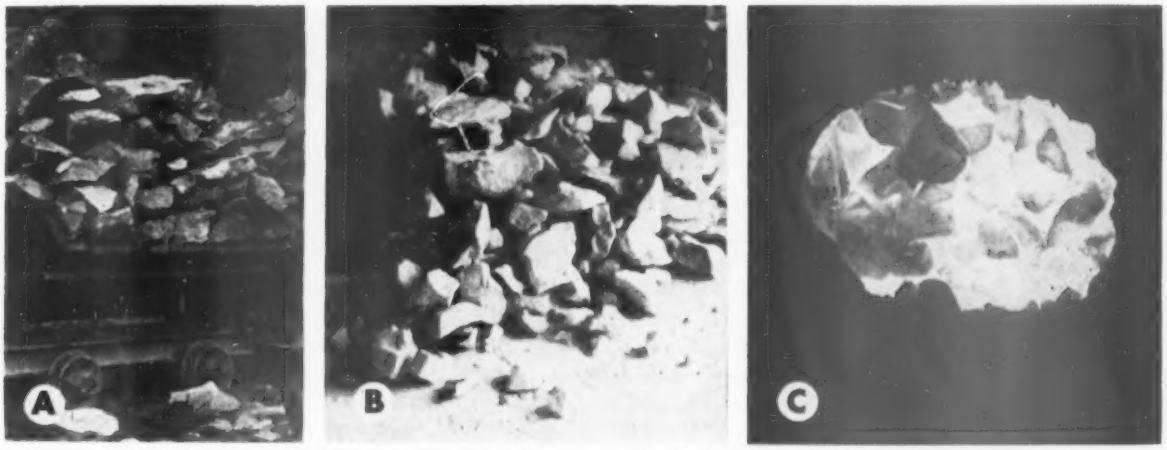
Fig. 9: Stone of excessive size range. (Note man's hat for comparative size)

the reduction of the viscous boundary layer; but even those which are completely in the gas flow shadows as "E" are still receiving some heat by convection and likely receive much by radiation from the burning gases "F." The smaller pieces of lime which are completely calcined and have acquired a higher temperature radiate much of such excess heat as they gather into the cooler regions within their sight "G."

It is only the surfaces which are in contact that are inactive as "H," but even in this case some heat is being transferred by conduction around through the solid as "J," since if this was not so the core that there may be would not conform in its shape so closely to the shape of the lime lump. Conduction of the heat through the solid in this manner is cooling the surface from which the heat was derived, inducing in turn the transfer of additional heat.

Heat Must Penetrate

To attain a high capacity from a given volume demands a high surface and high rate of flow which in turn creates a high draft drop. The capacity, temperature difference, surface, and pressure drop are under normal conditions in certain definite relation to each other, when from the kiln draft drop, one could mathematically predict the kiln production. But this requires that draft drop be due to flow in normal channels and not draft drop created by a block that would act as a closed or partly closed gate, which would retard the flow or deviate the flow causing unequal flow.



Low-flow resistance lime. Fig. 11: (A) Stone as charged. (B) Lime on floor. (C) Lime in kiln.

Thus, while a high draft drop may be indicative of high capacity, it also may be indicative of overly compact or nonuniform bed conditions. There may be non-uniformity due to segregation of the smaller and the large component which is the worse, but a uniform bed of wide range of sizes is bad also. We must remember that the smaller component which determines the flow resistance will calcine first and thereafter will idly occupy the space and offer resistance to no purpose.

The looser the kiln charge is and the greater the percentage of voids, the greater will be the surface exposure to the passing hot gases and so the greater the calcining rate. A loose kiln will contain less surface, but the surface will be more active. The looseness, however, should be uniform over the bed as non-uniform packing will cause non-uniform flow.

The resistance of a vertical bed of broken irregular solids to gas flow is determined by the number of openings, their orientation, their size and size expansions. The main friction loss really occurs when the gas jets into the expanded void of Fig. 3. Resistance depends on the openings themselves, but since there is no way of measuring them, dependence must be placed on the shape, size, size gradation, and percentage distribution of the particles themselves. To figure with any degree of accuracy the likely resistance of a lime kiln bed is impossible since besides the above variations in the stone there are variations in gas temperature and flow characteristics. There would be in all some 13 different factors to take into account and any single change in several of these has the tendency to change them all. In view of this, more reliance must be placed on results obtained from actual kilns under many varied conditions and this plotted against a theoretical background such as that of Fig. 2.

Measurements of Voids

C. C. Furnas has conducted extensive studies into such matters, studying beds of many sorts. To determine the relation of void to solid he would charge vessels with stone, then into the void space pour a slurry of plaster of paris. After hardening he would saw the container in two obtaining a face on which, by means of a planimeter, he could study the relation of the solid, which previously had been measured, to the void it created.

Figs. 4 and 5 present two such sections of closely sized limestone, a 50 percent diameter range. Some apparently smaller particles are present, but these are merely protrusions of the regular sizes located above or below the line that the saw passed through. As presented they are for natural size but the relationship would be very much the same whether they would be larger or smaller as long as they were of the same shape and size range. Thus we may assume that they represent 10-in. and 2-in. stone or 5-in. and 1-in. stone or less.

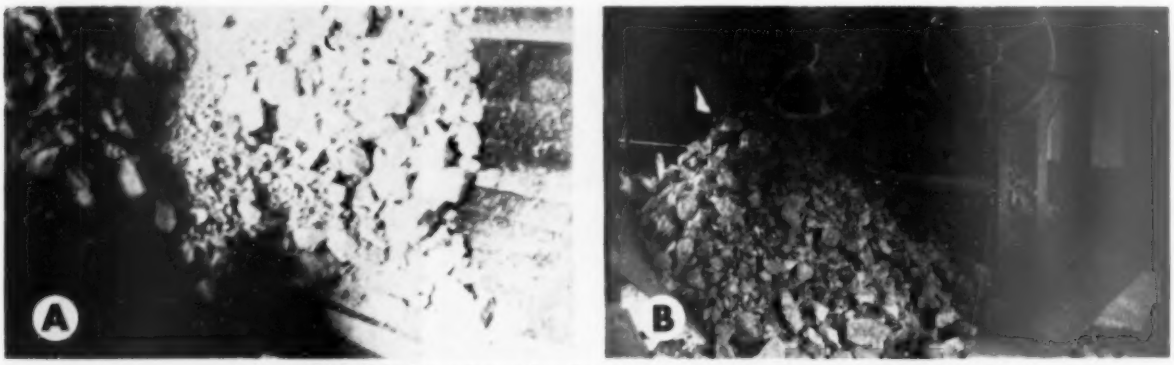
One section has as much void area as the other but the spaces are one-fifth the area, since the particles are one-fifth the size. Since pressure drop for equal flow rate is in inverse ratio to stone size, flow resistance for the bed of smaller rock would be five times as great as for the larger per foot of its height.

However, this is more than compensated for by the relative rate of calcination. The smaller stone presents five times the surface and only one-fifth the required calcining penetration. Therefore, it would calcine 25 times faster and that would mean only 1/25 the required kiln height.

The pressure drop per unit of height for the smaller size would be five times as great as in using the large size stone. But since the required height for the small size stone is only 1/25 that of the large stone, the total pressure drop would be only 20 percent of the total pressure drop in the large stone kiln. Using this small size stone, the capacity of the kiln would be 2.24 times the capacity of a large stone kiln when the total pressure drops are equal.

But the stone of almost any kiln

Fig. 10: Segregating storage and abusive handling of stone



Disintegrated high-gas-flow resistance lime. Fig. 12 (A): Strasburg kiln. Fig. 13 (B): Berkley kiln

charge runs over a considerable size range. The largest of these sizes cause harm because they block off a certain amount of the kiln flow gas area and also increase the required time of calcination. The smaller sizes tend to close off the constrictions between the larger. There would not need to be much of the stone of Fig. 4 added to the stone of Fig. 5 to do so, and that often occurs.

It is a matter of size gradation. Some of the stone may be smaller but not too small. To visualize this better, Fig. 6 was drawn for cordwood. Both "A" and "C" have a tighter packing than "B" because here the smaller component is of a size that holds the larger apart, while in the case of "C," the slightly smaller small component allows them to close up the space.

Fig. 7 "A," "B," and "C" shows the same for stone. A size component, only smaller such as "C," as compared to "B" closes up the bed. On the average, if the smaller component is 40 percent the size of the large, it will close up; if 50 percent, it will open up. This 50 percent size range is desirable from the flow and also the calcining rate standpoint. Calcining range would be 1 to 4, which is reasonable when compared to 1 to 10, or more, ordinarily found.

The foregoing illustrates the matter for stone as charged. It will be worse if the stone, as stone or as lime, loses its sharp edges and becomes rounded on the corners as illustrated by Fig. 8 "A" and "B." This can make quite a considerable amount of difference. It all becomes still worse when the charge is an aggregate ranging in size from 1 to 2 to 10 in., and becomes even more so when the charging allows segregation. It becomes increasingly worse if the heat causes spalling, or if the lime tends to crumble under high pressure, abrupt movement, or impact, or to shrink, disintegrate, soften and pack under heat.

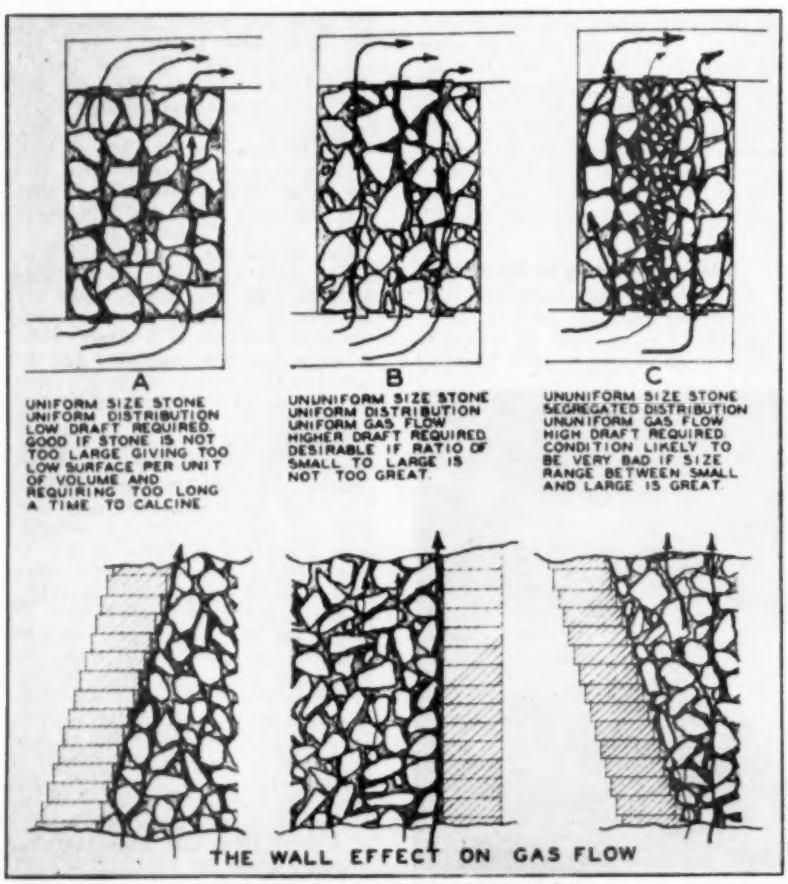


Fig. 14: Gas flow through beds of broken solids

Proper Sorting of Stone

Many kiln ailments are due to improper sorting of stone as shown in Fig. 9, or abusive handling of stone shown by Fig. 10. Storing in such piles, in such manner, always causes segregation and in handling by a dragline, the scraper causes abrasions of edges and creation of additional fines. It is all right if stone is later screened but in this case it was not.

Some stone is of a firm nature as that of Fig. 11. At "A" this shows the stone before being charged to the kiln and at "B" the lime on the floor after being drawn. There is no apparent difference between "A" and "B." The lime on the floor still possesses the sharp edges which is an important consideration since these edges act as fingers that keep the pieces apart and create a loose, open state in the kiln as shown by "C," a state allowing a free, uniform and equally distributed flow of the gases through the charge.

By contrast we present Figs. 12 and 13 showing the lime after drawing in plants where the lime was notorious for its disintegrating tendency. It is a wonder that any gas flow was attained through the bed of such an aggregate type of mass. That it was, is due to channeling featured

(Continued on page 134)

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tailored for the job!

CHARACTERISTICS

METHOD OF APPLICATION—A.C. or D.C. straight polarity.

NO SLAG INTERFERENCE, easy slag removal.

WIDE AMPERAGE RANGE with extreme arc stability.

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Quarry workers pose before quarry office and sign showing days worked without lost-time accident

FIFTEEN YEARS

Without a Lost-Time Accident

National Gypsum Co., National City, Mich., quarry achieves outstanding safety record under difficult conditions

By BROR NORDBERG

THIRTY-ONE QUARRYMEN from the National City, Mich., plant were honored guests of the National Gypsum Co. at a banquet held August 5, 1953, at the Barnes Hotel, Tawas City, Mich. The occasion was establishment of a record for 15 consecutive years of operation without lost-time accident, which is believed to be the longest safety record every established for any quarry. The record is still unbroken. We considered it a great privilege to have been invited to the banquet and to have an opportunity to pay our respect to this group of quarrymen by saying a few words.

The official record for the 15-year period, from August 1, 1938, to August 1, 1953, was 790,290 man-hours worked in quarrying 2,695,701 tons of gypsum rock. The last lost-time accident took place on July 31, 1938, when a member of the crew turned his ankle in stepping from the cab of a power shovel, to break a safety record that had then been underway for one and one-half years.

Plant manager C. H. Hill was master of ceremonies at the banquet which featured a number of speeches and the presentation of awards. In addition to President Lewis R. Sanderson who made the principal address, officials present from the Buffalo, N.Y., headquarters of National Gypsum Co. included Production Manager R. E. Scifres, Director of Safety M. C. M. Pollard, and C. P. Dunn of *National Gypsum News*. The U.S. Bureau of Mines was represented by John A. Johnson and Paul Allsman. Also present were all department heads of the National City plant and representatives of northern Michigan newspapers. Among the quarrymen on hand were Frank Smith, shovel operator, Mathew Haglund, truck operator, and utility man Elmer Winchell, who were in on the start of this unbroken safety record.

Congratulatory telegrams were read from Chairman of the Board Melvin H. Baker, Vice-president in Charge of Operations Fred A. Manske, and Vice-President in Charge of Manufacturing Wells F. Anderson.

President Sanderson, in his talk, gave full credit to the men in the quarry for the safety record and paid tribute to former quarry superintendent Luther Jones (now deceased) for his part in making safety the main objective in the quarry. Mr. Sanderson stressed that only the workers themselves, by their attitudes, can prevent the occurrence of accidents. He said that the best safety

(Continued on page 108)

Photo by Bert Stoll, Booth Newspapers

Arthur S. Kelly, senior engineer of National Safety Council, Chicago, to the left, presents Certificate of Commendation to Frank Smith of Turner, Mich., oldest quarry employe at National City plant of National Gypsum Co., who received it on behalf of 31 quarry employes honored for 15-year safety record

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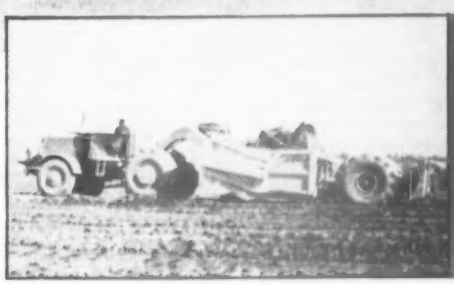

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- 10 speed transmission
- Loaded top speed 28 m.p.h.
- Completely interchangeable jacks
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THIS improved lever-type 15.5 yd. Euclid Scraper sets a completely new standard for scraper design, performance and serviceability. It has many profit making features that are not available in any other scraper on the market.

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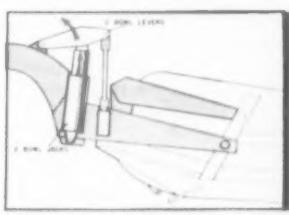
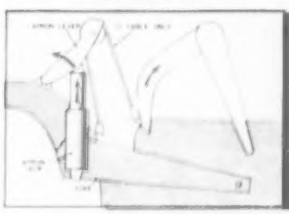
Yes, "Euc" Scrapers are better than ever—in performance, production, maintenance cost and job availability. See your Euclid distributor for all the facts that add up to less down time, lower costs and more profit.



High Bowl Lift



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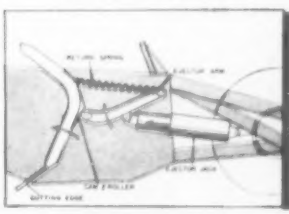

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Quarry superintendent Bob Allen, left, with John Smith, in charge of personnel and safety

slogan he knows is the one word "think," and that application of this slogan before tackling a job is the essence of safe operations.

Mr. Sanderson briefly traced the history and development of the National Gypsum Co. The company now has 36 widely-scattered plant operations, and its volume of business has grown from a humble beginning in 1926 to a level of $118 million annually. This represents a growth of some $40 million since 1950, the company's silver anniversary year, when ROCK PRODUCTS published "The National Gypsum Co. Story" (December, 1950) outlining the company's complete history, policies and practices.

Ken Gutschick, field editor, *Pit and Quarry*, gave a short congratulatory speech and outlined his publication's interest and practices with regard to accident prevention. We also paid our respects, stressed the longevity significance of the unbroken record, commented on the great company interest in accident prevention and drew comparisons with the exposure conditions of the last five years with what they were the first ten years. We were fortunate to have been present at a similar banquet in August, 1948, at East Tawas, Mich., when the quarrymen were honored for having worked ten full years without lost-time accident.

Arthur S. Kelly, senior engineer, National Safety Council, Chicago, Ill., paid a fine tribute to the workers and made an award of a Certificate of Commendation. Messrs. Johnson and Allsman of the Bureau of Mines extended their congratulations and

Quarry superintendent Bob Allen; taken on day of celebration

presented a Joseph A. Holmes award and a Certificate of Achievement to the men. The Holmes award, incidentally, is the thirteenth that has been presented during the course of the quarry's record for safe operation. These awards were presented to long-time workers Frank Smith, Elmer Winchell and Burton Freel, representing the crew.

Robert H. Allen, quarry superintendent, who succeeded Luther Jones in November, 1949, presented each employe with a personally autographed photograph of Melvin H. Baker and an engraved wallet containing a dollar bill for each year of service through the period of no lost-time accidents. The workers made a presentation to President Sanderson.

Tribute to the men was also expressed by C. L. McKenzie, formerly in charge of the safety program at the National City plant and now mill superintendent; production manager R. E. Scifres; director of safety for the entire company, M. C. M. Pollard; and Frank Smith who is the oldest quarry worker in years of service. Merrill Pollard gave recognition to each worker for having assumed personal responsibiilty for safe operation. He brought out that during the 15-year period there have been 77,000 disabling industries in the quarry industry overall and more than a thousand deaths from accidents.

Loading gypsum rock into heavy-duty trucks hauling 15 tons

The quarry at National City is one that must be operated under adverse conditions at times, due to slippery roads and ice, and operations involve the handling of tremendous quantities of overburden. Quarrying during the course of the safety record has required the opening of new locations and much development work, which

(Continued on page 110)

Quarrymen lined up in front of one of twin-engine scrapers used to remove overburden

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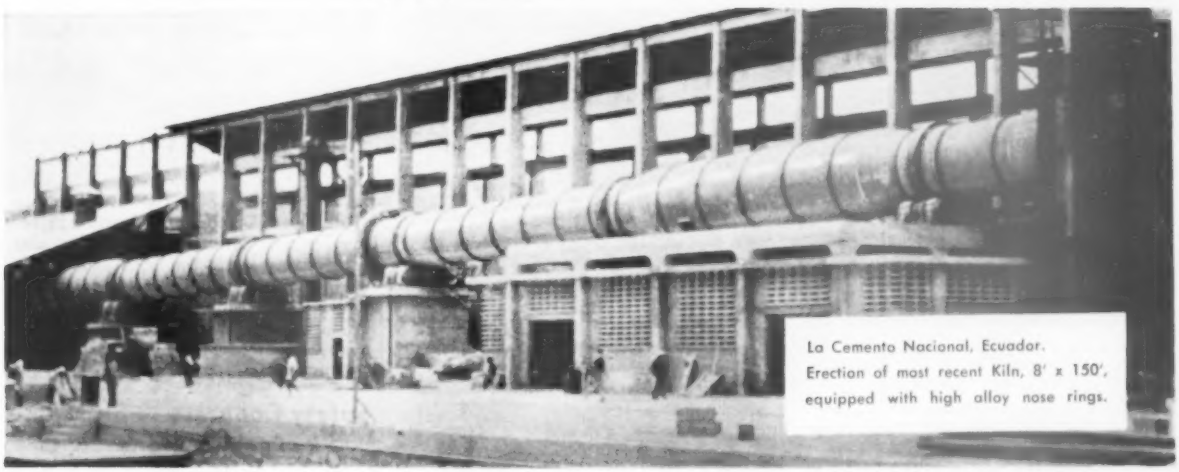

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Erection of most recent Kiln, 8' x 150', equipped with high alloy nose rings.

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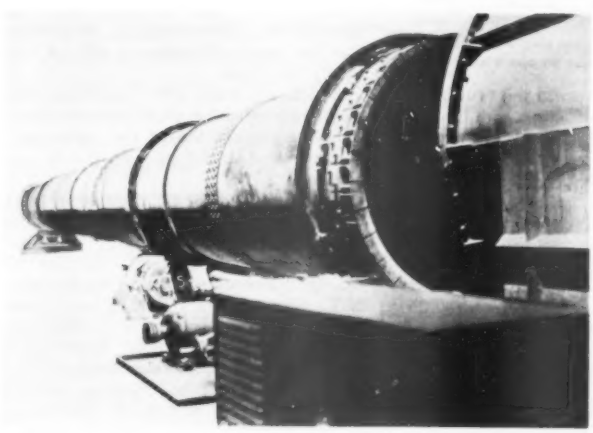

9' x 11' x 350
Rotary Kiln
Wet Process.

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One of the large twin-engine scrapers with front and rear diesel drives

does not contribute to optimum conditions for safe operation. Until 1940, when truck haulage was adopted, rock was transported to the mill by locomotives and cars. Various types of earthmoving equipment have been in use over the years and, at the time the 10-year safety record was celebrated, stripping was done on contract. The company now owns and operates its own large capacity stripping equipment. The last serious accident was on February 21, 1937, when a car tipped over and dumped rock on a man. Typical of National's policies, that class of equipment was quickly eliminated, and ways and means to eliminate accidents were thoroughly considered. That was the real start of great emphasis on accident prevention at National City.

When ten years without a lost-time accident was celebrated, there were 33 men employed in the quarry. Over that period, the record was 483,245 man-hours worked, 1,348,663 tons of gypsum rock had been excavated and delivered to the mill, and 2,340,118 cu. yd. of overburden had been moved.

After 15 years, the rock tonnage had increased to 2,695,701 and the man-hours to 790,290 which shows that there has been greatly accelerated production and greater exposure to accidents during the past five years on the average as compared to the first ten years. The average annual tonnage of rock and overburden handled during the past five years has about doubled the average annual rate for the ten previous years. The number of employes now is 31, of which more than one-half have been employed more than five years.

Overburden ranges from 35 to 50 ft., overlaying a vein of gypsum rock which varies from 12 to 20 ft. in thickness. This overburden contains a great quantity of clay and its removal also requires the stripping off of hard pan and gypsum float.

This view shows conditions under which large earth-movers must be operated

Illustrated herewith is the type of stripping equipment placed in service early this year. Two model 16TDT twin-engine Euclid scrapers with front and rear 180-200 hp. diesel-engine drives are in service. They were designed to dig and carry 25 cu. yd. They have side boards, rear drive wheel tires which measure 84 in. and are operated two shifts per day. Drilling and blasting are done the first shift and gypsum rock is loaded and hauled on two shifts. Rock is delivered to the plant in three diesel-powered Mack trucks hauling 15 tons to the load. These units went into service four years ago to step up production.

Bob Allen is quarry superintendent; Kenneth Clark is general quarry foreman; Roy Hutchison, quarry engineer; and Ken Bronson and Leonard Wasilewski are the quarry foremen.

C. H. Hill is plant manager; Mardis Turner is superintendent of production; C. L. McKenzie is mill superintendent; and John Smith is in charge of safety and personnel for the overall operation.

Basic safety practices of the National Gypsum Co. have been discussed in a separate article in our "National Gypsum Co. Story" published in the December, 1950, issue of ROCK PRODUCTS. The overall safety record of the company is excellent. In 1952, the injury rate for all its plants was reduced 31 percent despite a 10 percent increase in man-hours worked. The company injury rate is substantially less than the average for all industries and the reduction in recent years, for both frequency and severity rates, is the best proof that when management takes the initiative and has the cooperation and support of its workers in the prevention of accidents, many injuries and deaths can be eliminated.

Gypsum rock is in a thin vein and blast holes are driven by wagon drills

Safety Congress

THE 41ST NATIONAL SAFETY CONGRESS AND EXPOSITION will be held at the Conrad Hilton, Congress, Morrison and Hamilton hotels, Chicago, Ill., October 19-23, 1953.

At the opening meeting of the cement and quarry sessions, John Mather, vice-president, Lone Star Cement Corp., New York, N.Y., will discuss safety from the executive's viewpoint. He will be followed by Clarence F. Stetser, general superintendent, New York Trap Rock Corp., Newburgh, N.Y., who will present the crushed stone superintendent's view of accident prevention, after which Edward Schwartz, foreman, Material Service Co., Thornton, Ill., will outline the quarry foreman's role in the safety program.

Another session will cover pre-employment, periodic physical examinations, and operation of the plant dispensary and its tie-in with public relations.

One session will be devoted to the use of the camera and visual aids in promoting safety. Speakers will include M. C. M. Pollard, director of safety, National Gypsum Co., Buffalo, N.Y., who will show how to use visual aids in supervising training; Seymour Fleming, safety director, New York Trap Rock Corp., New York, N.Y., whose topic will be "Selling Safety With Pictures"; and A. B. Hoftiezer, safety supervisor, Laverack & Haines, Inc., Buffalo, N.Y., who will tell how to make safety inspections with the camera.

As in previous years, the American Society of Safety Engineers will present morning sessions on topics of general interest, including nuclear energy, industrial lighting, electronic testing, safety training, research, and human factors in safety.

The 1953 exposition will feature the largest and most comprehensive display of accident prevention equipment to be seen anywhere.

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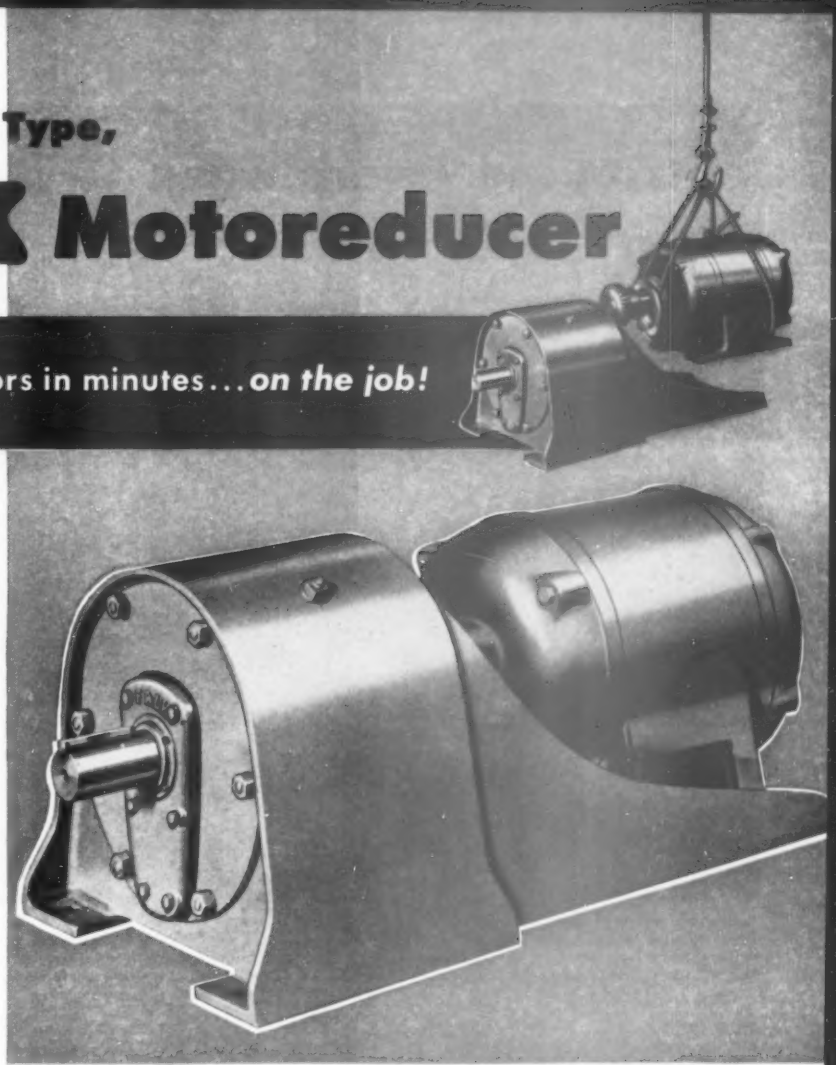

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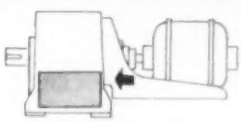
With the *all-steel*, All-Motor type FALK Motoreducer . . . the only complete and compact motorized reducer with a separately mounted, resilient Steelflex coupling-connected motor . . . you can replace or interchange motors, *or even parts*, in minutes—*on the job*, without long and costly "down time"! Ratios can be changed (within capacity) without motor modification.

Any make, speed, or type of standard foot-mounted motor within the unit's AGMA rating is usable *without modification* on this All-Motor type Motoreducer. Motors with variable speed drive arrangement can be used, if desired. No "partial" motor or special shaft is required in event of motor replacement—simply use a complete motor, available for quick delivery from factory or local stocks without expensive delays.

Add to these exclusive maintenance-saving advantages the FALK "In-built" Factors, described at the right, and you have an unbeatable combination of quality, application adaptability, dependability, long-range economy, and dollar-for-dollar value. Write for Bulletin 3104.



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Positive Lubrication. Large sump capacity . . . oil-tight construction assures clean lubricant . . . direct dip of revolving elements provides positive lubrication at all speeds.

Wide Speed Range. Selective ratio combinations provide output speeds from 1.5 rpm to 1430 rpm with stock gears.

Streamlined inside and outside. Smooth, clean surfaces; machine welded construction conforms to NEMA motor frames.

Sealed Housings. Dual closures and one-way vents keep oil *in*, dust and moisture *out*. Units are splash-proof, leakproof, dustproof.

Precision Gearing. Heat treated alloy steel, precision cut and shaved helical gearing throughout . . . quiet-operating crown shaved pinions . . . taper bored gears for easy ratio changes.

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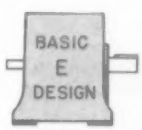

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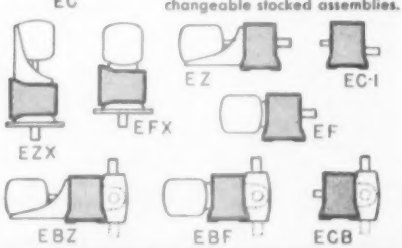

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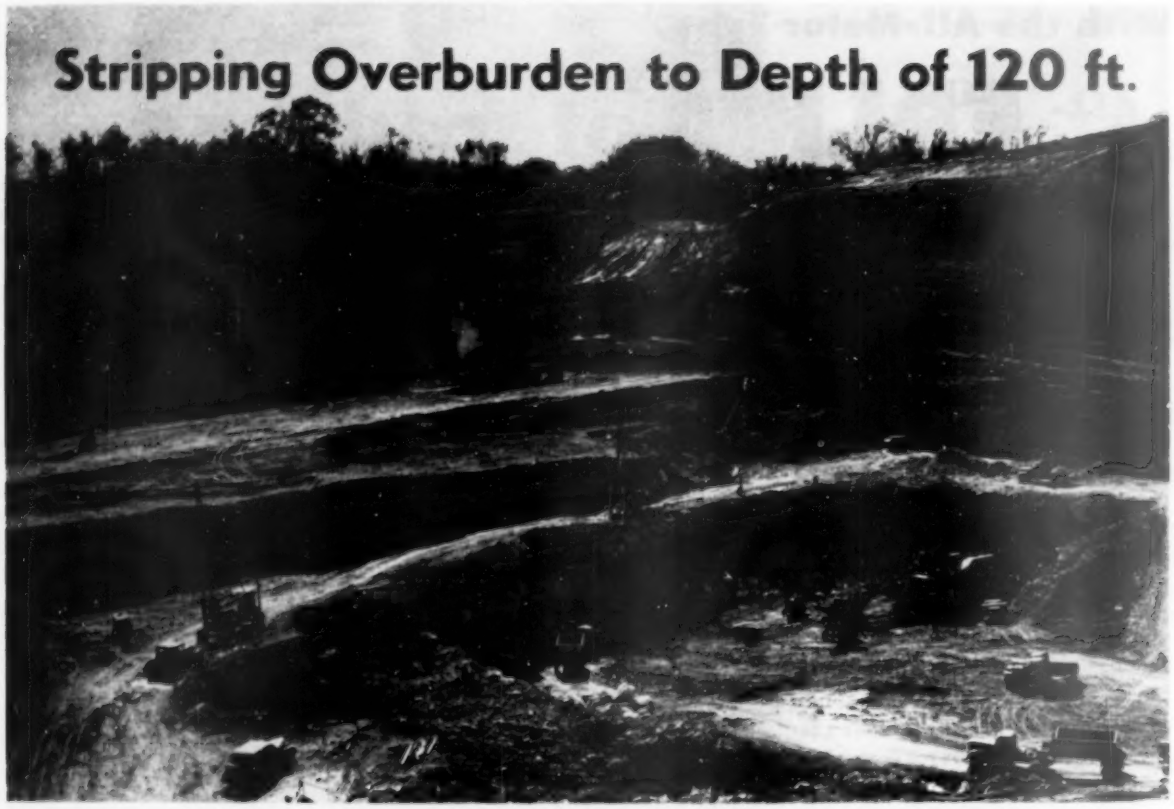
Stripping Overburden to Depth of 120 ft.



High grade strata of limestone, 45 to 50 ft. thick, is found in the Otis quarry of Concrete Materials and Construction Co., adjoining the city of Cedar Rapids, Iowa. Overburden runs to a depth of 120 ft. Two drills on the first level are driving blast holes down to the quarry floor. Blasting is done at the end of the day to provide material for the following day. On the quarry floor, a shovel loads the blasted rock into a surge bin feeding the primary crusher. Bottom-dump trucks then haul the primary crusher product to a 100-ton surge bin supplying the secondary crusher

DURING THE PAST FOUR YEARS, it has been estimated that 5,000,000 cu. yd. of earth have been removed to uncover approximately 5,500,000 tons of limestone from the Otis quarry of Concrete Materials and Construction Co., at the south edge of Cedar Rapids, Iowa. More than 5,000,000 tons of limestone remain to be uncovered in this operation.

The high quality of the stone makes it worthwhile to strip such a thick overburden even though in many instances it covers the 45 to 50-ft. strata of stone to a depth of 120 ft.

Two Model TS-300 Allis-Chalmers diesel motor scrapers with capacities up to 18 cu. yd. heaped are used with an Allis-Chalmers HD-20 diesel-powered torque converter crawler tractor as a pusher. This equipment has been working two 10-hr. shifts six days a week. The original units, placed on the job in 1947, piled up 18,000 hours of work before being replaced with equipment of the same type.

When the quarry has been worked out, the spoil banks will be leveled to provide an expansion area for the city of Cedar Rapids.

Left: When not acting as a pusher behind the motor scrapers, this tractor levels spoil bank with bulldozer blade. Right: Overburden is hauled by diesel-powered motor scrapers to the spoil dump at a speed of 22½ m.p.h.

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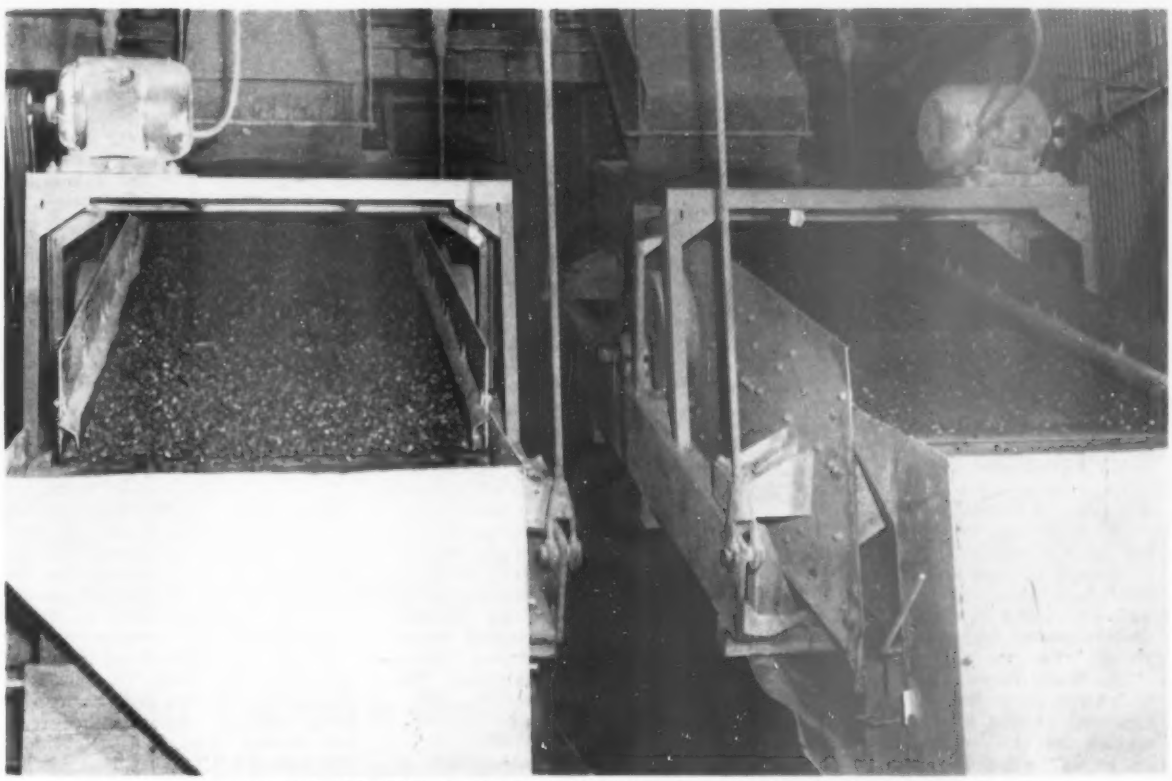

Photographed at Dock 8 Installation, Cleveland Slag Co., Jones & Laughlin Steel Plant

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Whether it's for screening and sizing block plant material at the Dock 8 plant . . . or for making eight sizes to meet OHIO State Highway Dept. specifications at the Corrigan-McKinney plant . . . a total of eleven Seco screens are on the job at this modern Cleveland installation. There's a year by year record of dependable performance behind this preference for SECOS by leading slag producers.

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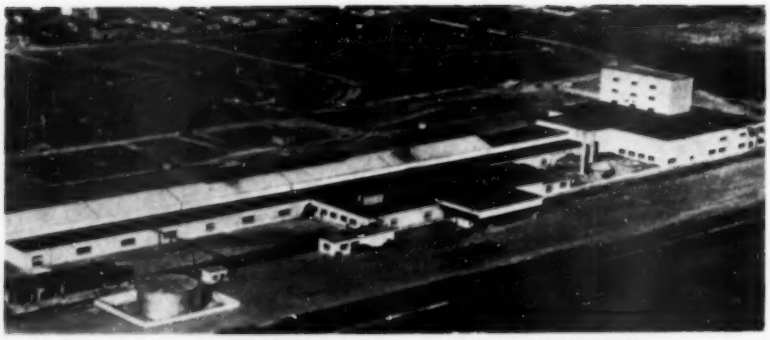


Aerial view of Windham plant. Raw material enters at extreme right

New Windham, Ohio plant of Harbison-Walker Refractories Co., is model of efficient, dust-free operation

Processing SILICA for Refractory Brick

REPRESENTATIVES of industrial publications and the U. S. Bureau of Mines were invited on July 24 to inspect the new silica processing and silica brick plant of Harbison-Walker Refractories Co., at Windham, Ohio. Said to be the only plant of its kind in the world, the Windham operation is part of the $30,000,000 expansion program undertaken by the company which was started in 1951. Another silica refractory plant also has been completed at Fairfield, Ala.

The new plant, which is near Warren, Ohio, is well located with respect to sources of raw material and the steel industries of the nation, as well as a cross section of other industries using high-temperature resistant brick.

The large Windham works covers an area of some 200,000 sq. ft., and is a neat, orderly, straight-in-line operation with the raw materials entering at one end and the finished brick emerging from the other. All phases of the plant where dust might be encountered are completely enclosed and the units are connected with an adequate dust collecting system.

Two types of silica brick are made at Windham, the Star brand which is regarded as a standard for quality, and the super-duty Vega brand intended for higher temperatures and more exacting work Both brands use small amounts of lime and an organic material as a binder. The binder permits the green brick to be handled easily and, in the firing, all the organic binder is burned out. Large power presses produce the major part of the plant's output. Special shapes can be made mechanically, or by hand molds. Steps in the manufacturing process include pit and raw material handling and storage, grinding, batching, mixing, forming, drying, firing, finished storage and shipping. The flowsheet gives the essentials.

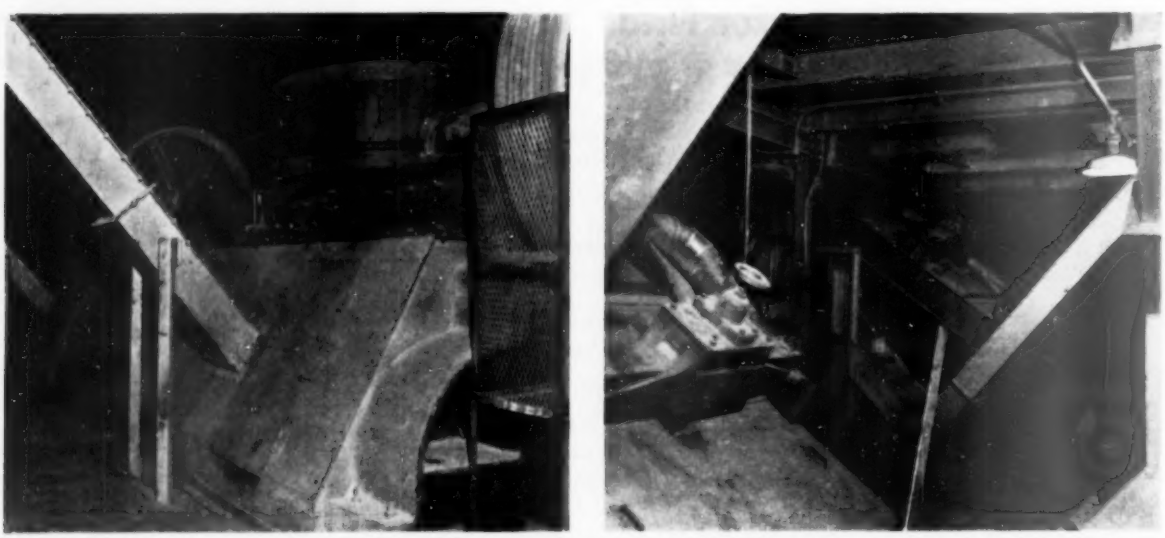
Quarry Operation

The raw material is obtained from the company's quarry six miles north of Windham Works, near Nelson's Ledges. It occurs in the form of an easy-to-crush quartz conglomerate rock. It belongs to the Sharon conglomerate member of the Pennsylvania system, and is of early Carboniferous age.

In the area in which the quarry is located, the rock averages 60 ft. in thickness and is overlaid by 5 to 20 ft. of surface overburden.

After removal of the surface, vertical holes for blasting are put down by air drills. The rock is worked in 20-ft. benches. Gasoline-powered shovels, equipped with ¾-cu. yd. grab-buckets, are used to load the material into 10-ton trucks that haul the material ¼ mile to the washing plant.

At the washing plant all of the conglomerate rock is crushed in a jaw crusher. Part of the rock is washed, and all of it is dried. The rock to be washed first passes through a cylindrical scrubber with attached trommel having $\frac{3}{16}$-in. slotted openings. The oversize is transported by belt conveyors to a stockpile. The undersize is fed to a rake classifier for further washing. The cleansed sands



Left: Totally-enclosed, dry-pan grinding units. Right: Electric vibrating screening units in the dry grinding circuits. Note piping for dust collection

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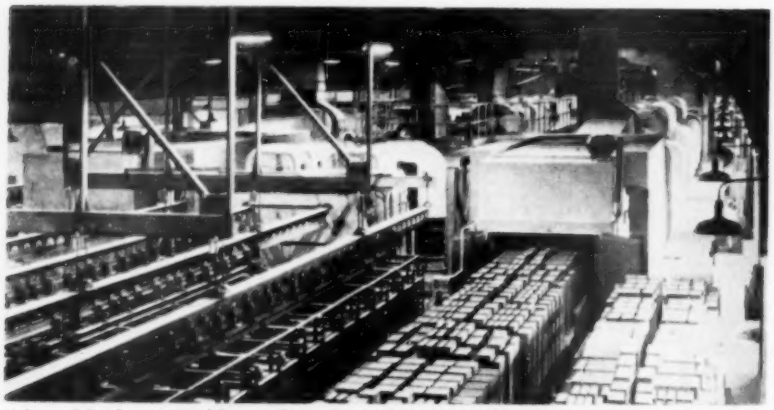
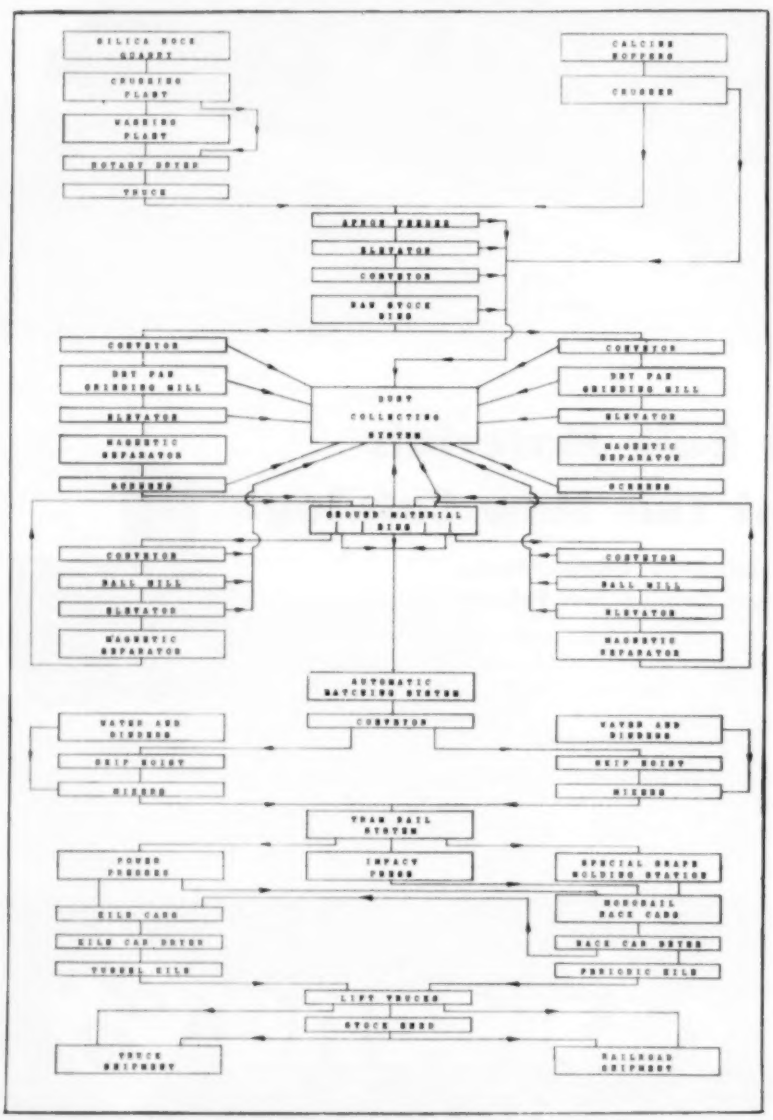


Unburned brick entering kiln car dryer. To the left, monorail tracks at entrance end of "rack car dryer"



Flowsheet of operations in the manufacture of refractory brick

from the classifier are discharged onto the same conveying belt which carries the trommel oversize to the stockpile. The water from the classifier, carrying fine silt in suspension, flows to a settling pond. The silt contains a large portion of the impurities which occurred in the original rock and its removal upgrades the quality considerably. From the stockpiles the rock is fed to an oil-fired rotary dryer which is provided with dust collecting equipment. The product is hauled by truck to the refractories plant at Windham.

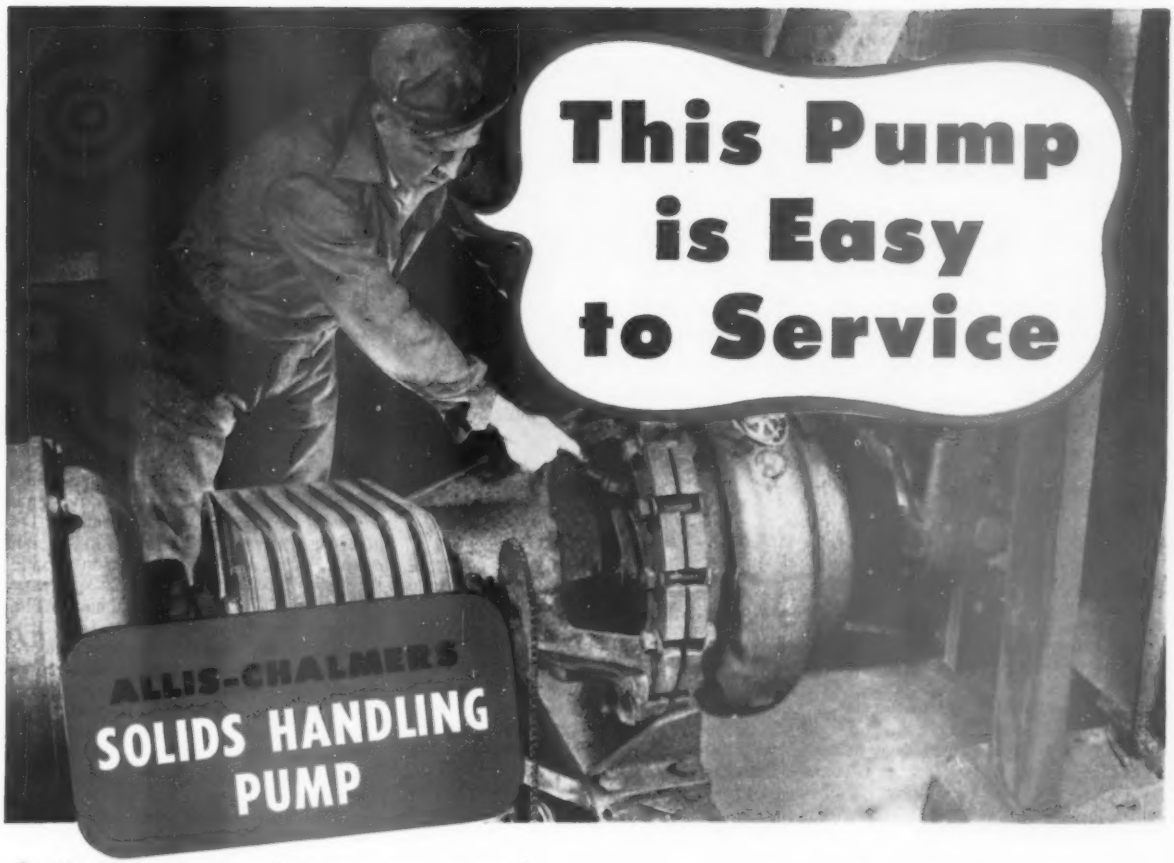
Manufacturing Process

The trucks unload to a truck hopper under which is an apron feeder and from thence, via bucket elevators and conveyors, the material is delivered to the raw storage bins. As the source of material is a friable quartz conglomerate, the crushed raw material has the appearance of a relatively small-size range, sand-gravel mix. Bucket elevators and vibrating conveyors are used for the most part in the preliminary raw plant at Windham. The conveyors are of a totally enclosed reciprocating type which handle from 15 to 60 t.p.h., depending on the size of the units. They have the advantage of being dust tight and take-off spouts can be cut into the units at any desired point. They feature low power requirements and wear is negligible.

From the raw material bins the crushed material is charged by electrically-vibrated feeders to the totally-enclosed dry-pans. The dry pan is a fine grinding unit using rotating mullers which are vertical running rolls with the power take-off from a vertical shaft. They operate on a short radius so grinding is accomplished by both the weight of the mullers and a shearing action. The mullers ride over solid roller plates reducing the size of the material, which when fine enough falls through slotted openings in the screen plates that form the outer surface of the dry pan-bottom. The material from the dry-pan is elevated to batteries of vibrating screens and the sized material is sent to bins. Oversize from the electrically-vibrated screens is returned to the grinding units. A certain portion of the raw material is ground to finer sizes in ball mills that are equipped with electric "ears." Constant weight feeders serve the ball mills.

All of the materials delivered to the dry pans or to the ball mills pass over magnetic separators to remove any magnetic material. These separators, which have a drum-type magnet, are mounted at strategic transfer points in the plant.

The mixers, in which the batch is given its final processing in preparation for molding, consist of totally enclosed stationary pans having rotating mullers and scrapers. The feed



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- **Can be taken down and returned to service in less than a half hour.**
- **Many parts interchangeable between different pump sizes.**

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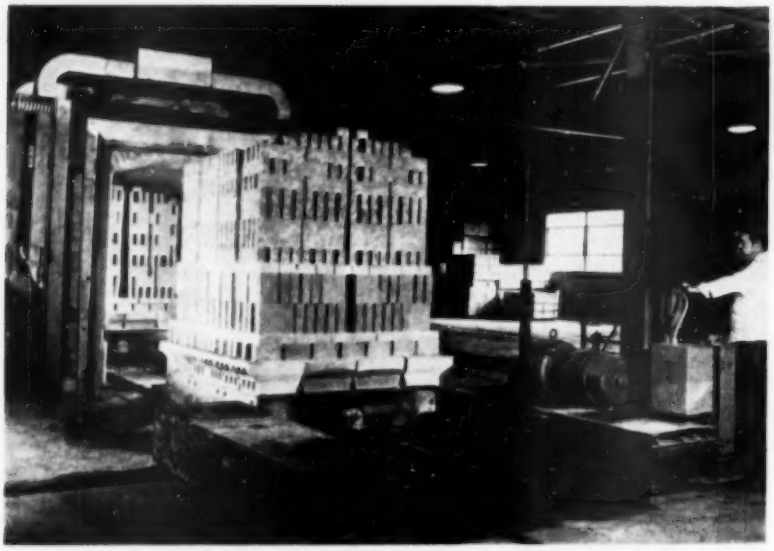


Fired brick leaving tunnel kiln. Transfer car in foreground

to the mixers consists of the ground and properly proportioned silica raw materials, water, and binders. The mixers are so connected to the batching system as to receive all of the materials in pre-determined sequence. The mixing times are standardized. At the end of the time allotted, the contents of the mixer are discharged into tram buckets. When filled, the buckets are delivered to the presses or special-shape molding stations, where they are discharged electrically by the tram operator.

The high-calcium hydrate lime, used as a bonding agent, is delivered to the plant by railroad in hopper cars. It is unloaded into a lime silo, and is delivered to bins at the mixers by means of a pneumatic conveying system. Other binders are delivered by railroad car and transferred to the mixing system.

The green brick from the presses are delivered to the dryers which are of the tunnel type. These are in line with the firing kilns that follow the drying operation. The cars with their loads of green brick are pushed through the dryer by high-capacity rams and progress through the dryer and kilns on pre-determined schedules.

The firing kilns are 567 ft. long and each holds 81 cars. The load cross section is 6 x 5 ft. Oil is used for fuel at present. Hot air from the cooling section is used for primary air at the burners. The kilns are provided with thermocouple and radiomatic temperature measuring instruments. During the firing period the silica brick show a permanent increase in dimensions. This expansion amounts to about 14 percent by volume.

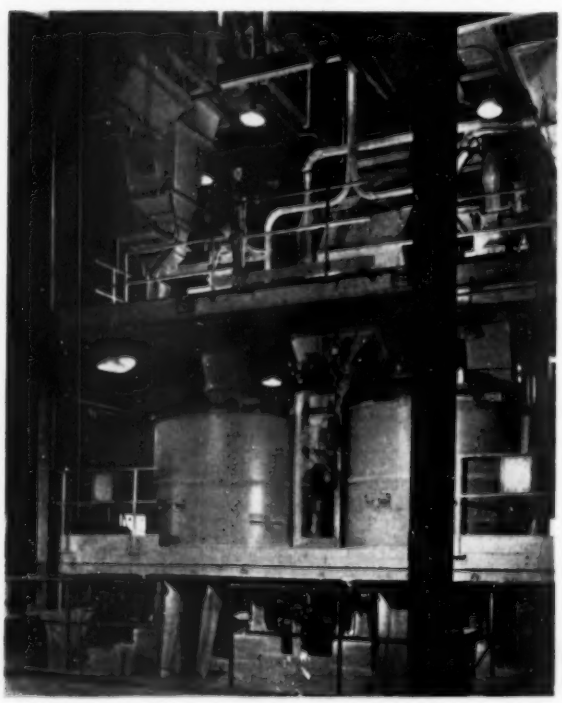
After firing and cooling, the brick are palletized and handled with lift trucks for storage and shipping operations.

Silica Refractory Properties

Of all types of commercially available refractories, silica brick come nearest to being made of a pure oxide. The silica brick of conventional type consist of about 96 percent silica, 1-2 percent accessory oxides in which alumina (Al_2O_3), and iron oxide (Fe_2O_3) predominate, and 2-3 percent lime, which is added as a bond. The properties of these brick are high refractoriness, rigidity under load at high temperatures, high resistance to spalling influence of rapid temperature change above 1200 deg. F., high mechanical strength and resistance to abrasion, high resistance to attack by acid slags and various other corrosive fluxes.

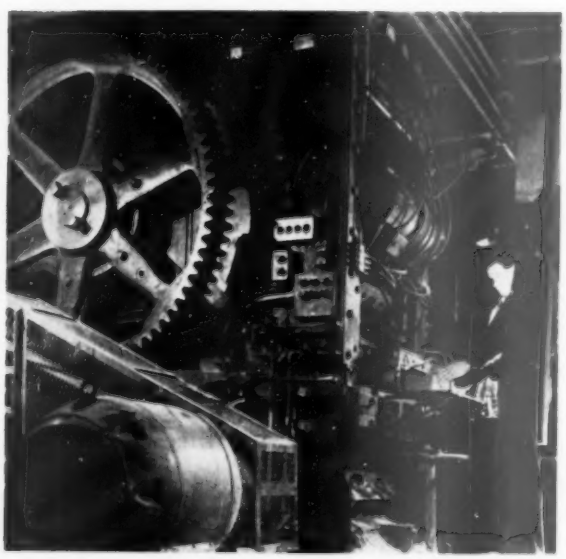
The Star brand conventional-type silica brick are extensively used in a wide variety of industrial furnaces. They are employed in the construction and maintenance of open-hearth and electric steel furnaces, by-product coke ovens, retorts, glass tanks, cop-

(Continued on page 120)



Left: Showing two of the mixers, below, and tramrail buckets, above. Note piping for dust collection

Below: Power press for manufacture of refractory brick



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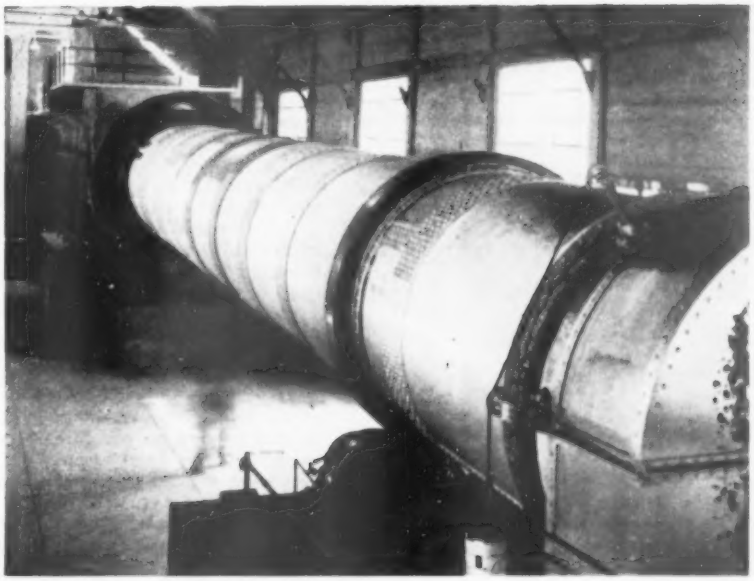

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Silica Brick

(Continued from page 118)

per reverberatory furnaces, copper and nickel refining furnaces, wire-bar and anode furnaces, vertical shaft lime kilns, and various other furnaces. They are used for the construction of sprung-arch roofs of furnaces differing widely in their applications.

The super-duty silica brick, Vega, was developed by Harbison-Walker to meet the demand for a silica refractory that would permit higher furnace temperatures, give longer life and reduce maintenance costs in most of the applications enumerated in the preceding paragraph.

The technical reasons for the development of super-duty silica brick are given in the following paragraphs. Silica brick in the cold condition contain several percent of silicates in a body which is otherwise crystalline silica. Upon being heated to high temperatures, the silicates melt to form a liquid; as the temperature rises, the amount of liquid increases through solution of silica, at first very slowly and then more rapidly, especially above 2900 deg. F. When relatively small amounts of liquid are present, the solid crystalline portion of a brick forms a rigid structure, with liquid merely between the solid particles, and the brick as a whole retains its rigidity even under load. However, with the larger amounts of liquid developed at higher temperatures, the bond is weakened, and the brick may lose its rigidity under load.

Since it is the amount of liquid present at high temperatures which causes the brick to lose strength, reduction in the amount of this liquid raises the high-temperature strength of the brick. The percentage of liquid formed at high temperatures in brick containing the usual amount of lime decreases almost in direct ratio to any decrease in alumina, titania and alkalies.

The raw materials used for making Vega are quality-controlled so that the total content of alumina, titania and alkalies does not exceed 0.5 percent.

General Manager

MRS. LILLIAN C. DIRKS has been named general manager of the Colorado Insulating Co., Denver, Colo., manufacturer of rock wool insulation. She was formerly office manager and succeeds James E. Donnell, who has been appointed vice-president of the Yorktex Co., Muncie, Ind. Mrs. Dirks is believed to be the only woman in the nation holding such a position in the insulating industry.

District Manager

R. V. PETERSEN has been appointed district manager of the Seattle, Wash., office of United States Gypsum Co., Chicago, Ill. He succeeds H. R. Deadman, who has been named advertising manager in the Chicago office.

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In addition to various kinds of multi-purpose hose, Thermoid makes hose for certain specific applications, such as paint spray, suction, creamery, etc. Call your Thermoid Distributor. He can supply you with the Thermoid Hose best suited for your requirements. Or write direct for Catalog No. 3680.

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Vibration Effects

HAROLD H. WHITE, consulting engineer, Joplin, Mo., has announced publication of the booklet, "The Effect of Vibration from Commercial Blasting." The booklet is the first of a series dealing in detail with the problems of vibration generated by explosives. It was compiled by Mr. White from experience gained over a period of 25 years in mining, construction and the explosives industry where his efforts were applied to technical development and field research surrounding the study of the effects of blasting.

Topics covered in the book include: Earth Motion; Vibratory Motion; Comparison Earthquake and Blast Waves; Vibration Effects; Effects of Terrain; Air Borne Effects; Human Response to Vibration; Instruments Used for Measurement of Vibration; Tabulations of Effects; Bureau of Mines Tabulations; Underground Effect; Effect of Caves; Damage to Adjoining Rock Structure; Repeated Vibration; Occupational and Traffic Vibration; Resonance; Delay Blasting; Millisecond Delay Effects; Geophysical Prospecting Charges; Loading Density Chart; Calculation of Forces; Reasons for Cracking of Construction Materials; and Controlled Blasting.

Mr. White announces that he has a limited number of copies available for free distribution to interested contractors and quarry operators.

Industrial Hygiene Report

THE INDUSTRIAL HYGIENE FOUNDATION OF AMERICA, which is a research association of industries for advancing industrial health and improving working conditions, has published a 47-page report of the "Transactions of the Chemical Toxicological and Engineering Conferences of the 17th Annual Meeting of Industrial Hygiene Foundation." The following topics are discussed: "Effects of Gases Encountered in Fires and Hot Processes"; "Plant Program for Protection Against Fire Gases"; "Utilization of Specialized Laboratory Equipment in Solving Industrial Hygiene Problems"; "Significance of Exposures to Dusts of Low Silica Content"; "Toxicology of Halogenated Aliphatic Hydrocarbons"; "Designing Exhaust for Control of Beryllium, Fumes, Dusts and Mists"; "Stream Pollution from Industrial Sources"; and "Typical Examples of Noise Reduction in General Motors Corp."

The report, which is accompanied by several illustrations, is available from the Industrial Hygiene Foundation of America, Mellon Institute, 4400 Fifth Ave., Pittsburgh 13, Penn., for $1 per copy.

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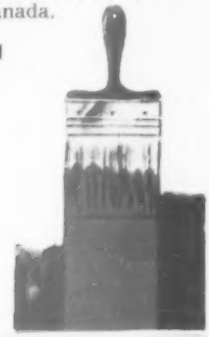

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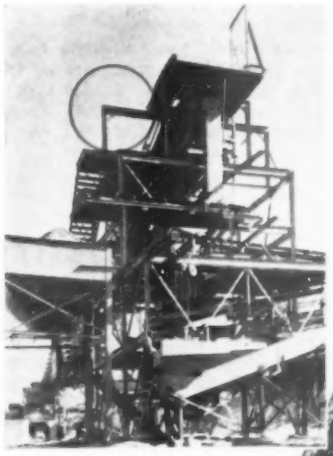

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Skanska Cement Plant

(Continued from page 87)

(by the Union Melt method) and has 3 roller supports. The new Polysius spline connection between the riding rings and kiln shell has been used and measurements show practically no shell deformation. The kiln is driven by a 75-hp. adjustable speed motor and normally is run at 60 r.p.h. The grate and kiln motors can be regulated from the kiln control panel for automatic operation. All kilns are provided with an emergency gasoline motor drive.

The new kiln has a 9-ft. 10-in. x 92-ft. rotary cooler. There is no need for rapid air quenching of this clinker. Over a length of 44 ft. from the discharge end, the cooler is provided with lifters and flights. There are 9 ft. of heat-resistant cast steel lifters followed by 14 ft. of heat-resistant steel plate flights and 21 ft. of ordinary steel plate flights. The discharge temperature of the clinker is about 430 deg. F. By water spraying, the temperature is reduced to some 280 deg. F. To increase the cooling, 6 to 9 ft. of additional lifters will be added.

A short vibrating trough conveyor feeds the clinker to two slow-speed, 74-ft. high elevators, one of which is a spare, which discharge the clinker on to a belt conveyor running above the kiln house roof to the storage building. The belt conveyor is of an interesting, entirely new design developed by the Swedish firm of Sandviken Steel Works. The belt core is a 0.04-in. steel belt, top and bottom of the belt being $\frac{5}{8}$-in. heat-resistant rubber. The pull is taken entirely by the steel core which is unaffected by the heat. The belt does not warp or spill.

Instrumentation

Operation of a double-pass Lepol kiln requires a number of first-class instruments. The kiln control board is provided with the following instruments:

12 temperature instruments, of which 6 are recording
10 pressure instruments, of which 4 are recording
5 speed-measuring instruments, of which 2 are recording
4 damper position indicators, of which 2 are recording

Of particular importance to economy is the use of a Bailey oxygen recorder.

To run a kiln entirely by instruments it is necessary that they be kept in working order and dependable. A special instrument man services all instruments continuously.

The enlarged plant requires only two new operators, for the raw mills and for nodulizing, which was possible through making the new installations as simple and easy as possible to operate. Push-button operation from the control boards is employed throughout. There are three centralized control boards: in the raw mill room, at the nodulizing station and at the burner station. All motors are squirrel cage with direct-on starters except for the kiln and grate motors. Where variable speed is required, PIV remote-controlled variable speed gears have been installed. A signal panel on the control board sounds alarms for abnormal temperatures, empty or overfilled bins, failure of cooling water supply, etc. On the panel a red light indicates the location of the failure. After the alarm has been turned off the red light remains until the failure has been corrected.

Finish Mills

There were two slurry mills and two clinker mills for the wet process plant. The former have now been converted and thus the clinker mills comprise two 7- x 36-ft., 3-compartment mills, and two, 8- x 40-ft., 4-compartment mills. They are all of the F. L. Smidth central-shaft type.

The mills are provided with Hardinge electric ears and are operated in open circuit, driven by synchronous motors of 650 and 1000 hp., respectively. At a fineness of 95 percent passing a 170-mesh sieve they produce 72 and 110 bbl. per hr., respectively, the power consumption being 5.3 kw.h. per bbl.

Packing Plant

Finished cement is conveyed pneumatically to the storage silos at the packing plants. There are two packing plants. The main plant, built in 1935, serves the 3-ft. gauge railway and small ships (150-200 tons) plying Lake Venern and the Gota River. For transfer to the ships, rubber belt conveyors are used. A new plant for truck delivery, built in 1951, was placed on the outer edge of the plant area to minimize traffic congestion.

The main plant has a 10-spout F. L. Smidth Fluxo packer with a capacity of 1000 bags of 50 kg. (11 lb.) per hour and two old Bates' packers. Four 72- x 49-ft. diameter, 30,000-bbl., storage silos are used for this plant.

The truck packing plant has two 46- x 26-ft. diameter, 6000-bbl. silos provided with Polysius' aeration tile. The cement is drawn off through air-operated bottom valves controlled by bin level indicators in the packer feed bins. Two Haver and Boecker 4-spout packers were installed, capable of packing up to 1000 bags per hr. Cement handling in this plant is entirely automatic and the entire plant is operated by two men, one at each packer. Bags are elevated from the railway car by a small lift and stored above and brought down to the packers in slides. The plant is operated from a push-button control board at each packer station.

Retractable rubber belt conveyors, push-button controlled by the truck drivers, bring the bags out over the truck. There also are facilities for loading bulk cement. The packing plants, like other departments where

necessary, are provided with bag-type dust collectors.

At present the State Railways are rebuilding the line to standard gauge and the plant switching yard is being rebuilt accordingly. To meet the increase in production the packing plant had to be enlarged and, in connection with the track rebuilding, it was found advantageous to build a new packing plant alongside the existing one. This plant, now under construction, will have two 36,000-bbl. silos and two Haver and Boecker new-type packers in which the cement is deaerated and compressed before entering the bag. It is expected that paper consumption will drop by at least 7 percent as a result. These packers also have an electrically controlled adjustable timing arrangement by which the bags leave the packer in the proper order and at set fixed intervals. This plant was designed along the lines of the truck-loading plant which has proved very satisfactory in operation.

On completion of the standard gauge track the new plant will be used for railway loading, with the old plant mainly serving ships. As compared with the old plant the new plant is expected to save some 20 percent in labor.

Power

Wages in Sweden are comparatively high and labor has been scarce since the war, so reduction in manual labor is a trend throughout the Swedish industry today. Progress in this respect at the Hellekis plant is shown by the following figures on the number of barrels of cement produced per man-hour:

	bbl./man-hour
1939, the last normal year before the war	2.55
1946, the first normal year after the war	2.70
1949, after modernizing the quarry	3.03
1952, after further modernization	3.84

When the present program is completed, production is expected to reach 4.5 bbl. per man-hour. The above figures are based on all labor employed, from the quarry to the packing plants, and include all supplementary personnel in the work shops, garage, harbor, house keeping, etc. Office employes are not included.

Operating personnel in the plant proper consist of the following shift-working operators:

Crusher and stone conveyors	2 men (2 shifts only)
Travelling crane, storage building	1 man
Raw mills and precipitators	1 man
Raw mix and nodule conveyors	1 man
Nodulizing	1 man
Kilns, burning	1 man
Kilns, lubricating	1 man
Clinker conveyors and elevators	1 man
Coal mills	1 man
Clinker mills	1 man
Compressors and cement pumps	1 man
Laboratory	1 man
Electrical maintenance	1 man
Mechanical maintenance	1 man
Total	15 men

Modern work shops, mechanical and

electrical, handle all repairs and maintenance.

Consumption of electric energy in 1952 amounted to 17 kw.h. per bbl. of cement, as follows:

Quarry	0.42 kw.h./bbl.
Crusher	0.32 kw.h./bbl.
Raw mills	4.35 kw.h./bbl.
Kilns and coal mills	2.70 kw.h./bbl.
Clinker and conveying	6.85 kw.h./bbl.
Miscellaneous	2.36 kw.h./bbl.
	17.00 kw.h./bbl.

During the last few years the kilns have been operating 7900-8100 hours a year.

Electric System

(Continued from page 99)

ment for bulk loading or carriage to the pack-house.

Confidence in sturdy, compact, Class 3 gear-motors for directly-coupled drives in out-of-the-way places is illustrated by their almost universal installation at the Bunnell plant. They are used for elevator drives (Fig. 23), for screw-conveyor drives (Fig. 24), and for packing machine drives (Fig. 25).

These drive units are dust-resistant, have grease-lubricated anti-friction bearings, and require less maintenance than that normally provided for direct applied motors under normal use.

These enumerations of drive details indicate that modern cement plant operators are insisting on the accurate speed adjustment of direct current drives of the generator-voltage-controlled variety for feeders and are also concentrating on properly applied Class 3 integral gear motors where compact, safe and sturdy drives of heavy torque machinery are necessary.

Safety Handbook

THE NATIONAL SAFETY COUNCIL has announced the publication of its new "Handbook of Accident Prevention for Business and Industry," intended as a convenient safety guide for the manager of a small business, or the supervisor of a department of a large organization.

The handbook, which shows how to set up and maintain a safety program, gives detailed information regarding plant layouts, materials handling, housekeeping, machine guarding, electrical and pressure-vessel hazards, first aid, fire prevention, and personal protective equipment. It also advises the small business man who cannot afford to employ a full-time safety specialist, how to make use of outside assistance. This 94-page handbook is available from the National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.

Director of Research

DR. J. EDWARD LYNN has been named director of basic research for National Gypsum Co., Buffalo, N.Y. He was formerly director of the textile chemicals laboratory of the American Cyanamid Co.

Midwest Meeting of Ready-Mix and Sand and Gravel Producers

MEMBERS of the National Sand and Gravel Association and the National Ready Mixed Concrete Association from the States of Illinois, Indiana, Iowa, Michigan, Minnesota and Wisconsin met in Chicago, August 14, to hear Executive Secretary V. P. Ahearn and Director of Engineering Stanton Walker discuss current developments of interest to the industry and to midwestern producers specifically. This annual regional meeting was well attended and was of an informal character with plenty of floor discussion. Business conditions, the status of cement supply, and other matters of greatest immediate interest were also covered.

President Albert R. Shiely of N.S.G.A. was presiding officer for both the morning and afternoon sessions. There was a luncheon and, in the evening, a number of producers attended the All-Star football game. Tickets for this annual classic were procured through the Chicago Gravel Co.

The entire morning session was devoted to a talk by Stanton Walker and discussion of engineering problems as brought up from the floor. Mr. Walker first discussed specifications for concrete aggregates, specifically the recent A.S.T.M. recommendations which have introduced new factors. Whereas there had only been a guide form and no specific specification, now A.S.T.M. has come up with a specification of limits to protect customers on a national basis. Some of these limits will result in complications in some areas.

Probably the most important has been recognition by A.S.T.M. that aggregates are not chemically inert, the principal restrictions recognizing the alkali-aggregate reaction by imposing limits on the reactivity of aggregates or on the conditions of use.

While the midwestern area has had no reason to be concerned with this matter, Mr. Walker mentioned that in Michigan and in other areas, specifications by engineering firms have placed limits on reactivity. The burden of proof then falls on the producer. The questionable minerals are generally forms of non-crystalline silica which supposedly react unfavorably with sodium and potassium oxides when they exceed an established minimum. If the mineral be chert, for example, it is considered potentially reactive and may require the use of low alkali cement or inhibitors such as fly ash or calcined shales.

Mr. Walker cautioned that some of these additives are being promoted as cure-alls with the result that excessive use may result in difficulties with quality. Mr. Walker said that reactivity may be corrected in many cases and that most of the producers present had no problem of that kind.

He next commented on new A.S.T.M. specifications for building sands. New requirements for masonry sand are very difficult to meet with respect to gradation and uniformity. The gradation specification for plaster sand overlaps that for masonry sand to the extent that it is difficult to produce one product for both purposes. It is Mr. Walker's belief that the requirement is too rigid and he hopes for a revision. Vermiculite and perlite are included in the new plaster specifications. These materials, he said, have hit the sand and gravel producers hard competitively except cost-wise.

Use of gravel in bituminous mixtures has gained considerably and this application will be maintained, he said, if producers will recognize the limitations of gravel with respect to some mixtures. There is a wide range of asphalts and mixes which must be considered in selection of the suitable coarse aggregate. Angularity as well as gradation may have a bearing on stability. The availability of crushable sizes is one of the problems.

Mr. Walker then discussed engineering developments of specific interest to ready-mixed concrete producers. He said that volume continues to increase and, with it, come more difficulties. The demand is for more control of product and its uniformity, and there is a trend to more use of strength specifications. More use of tests is being made and most of the difficulties result from how sampling and testing are done to measure quality. Another trend is to the use of more of the higher compressive strength concretes, which aggravates the problem.

Mr. Walker cautioned that careless use of air-entraining agents can cause serious loss of compressive strength and he warned that there are admixtures of doubtful value on the market. Fly ashes and slag cements (pozzolanic) may be used to advantage but, as he put it, the right ones must be used and then properly. Their use may show higher strengths than straight portland cement concrete but such tests may not be verified in applications where favorable curing conditions are not attainable. A report on this subject is soon to be made to the industry.

Mr. Walker touched upon the eighth annual short course soon to be held and on researches underway. The series on the effects of curing is going on and studies are being made on thermal compatibility and the use of admixtures.

In the question and answer period following, Mr. Walker said that finely

divided active siliceous materials as admixtures, react slowly with the lime in concrete to give added strength. They aso react quickly with alkalis in the cements.

There was quite a bit of discussion of capping of test cylinders and proper handling of the cylinders in order to have truly representative tests. Plaster of Paris capping is not recommended. Leadite capping may or may not give satisfactory results. Thick capping is not desired. Lumnite cement and neat cement make good capping if done properly.

In answer to a question from a producer who had marked loss of slump in concrete when delivered in hot weather, Mr. Walker said that if specified limits on amount of water were met in the plant, that additional water should not be added at the job. Such a specification is considered a bad one.

On the subject of divided sizes of coarse aggregates, Mr. Walker is for the practice because it simplifies the job of aggregate producers in minimizing segregation. It was recommended that producers have a good quality control man on the job as a means to produce the utmost in uniform concrete.

Business Conditions

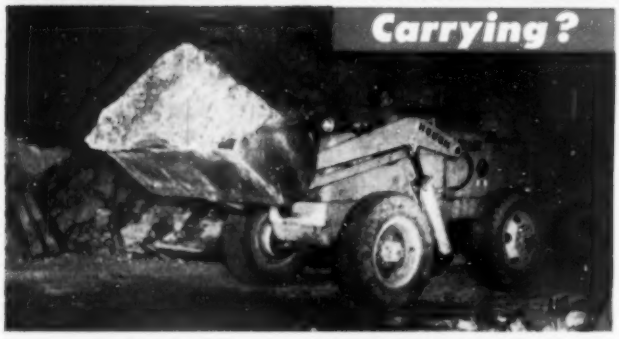
A poll on business conditions indicated that 1952 was an excellent year, with many reporting increases of 10 to 20 percent in volume over 1951. The weakness is in rural areas where business is showing signs of softening due to apprehension on the part of the farmer. It was predicted that the use of ready-mixed concrete in the Chicago area will continue to grow for the next five years. Some producers reported that the average sizes of orders were becoming smaller, reflecting the increase in maintenance work and smaller jobs.

Practically all the producers said that the cement supply situation has markedly improved and the majority anticipate getting their full requirements. Mr. Ahearn said that cement continues to be seriously short of supply in other areas. One sore spot is Los Angeles County. He said that some cement manufacturers are still pressing for accelerated amortization of plant expansion. Shortages exist in Pennsylvania and New York State as well as New England. Lehigh Valley cement mills are not likely to be able to meet demands in 1954. New York State is likely facing the worst cement shortage known because of the demands for the New York Thruway. Consumers of cement in Ohio will be hurt in 1954 when the Ohio Turnpike is to be under full construction. A decline in business in the southeast together with an increase in cement production has eased the cement supply situation in that area. Puerto Rican cement, however, is expected to continue to be shipped into Florida.

Mr. Ahearn commented on the re-

(Continued on page 137)

What's Your Problem?



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INFORMATION

You can obtain catalogs listed on these pages by merely checking and mailing the coupon below

TO HELP YOU MEET TODAY'S PROBLEMS AND TO MAKE PLANS FOR TOMORROW

1 AIR COMPRESSORS—Davey Compressor Co. has announced the availability of an eight-page bulletin describing and illustrating its line of industrial air compressors. A comprehensive table shows the number of industrial tools which can be operated by each size compressor.

2 ALLOY CASTINGS — American Brake Shoe Co., Electro-Alloys Div., has available Bulletin T-226, describing Thermalloy alloys and their use for kiln ends, nose rings, feed pipes and dampers. Illustrations, drawings and data are given.

3 ARC WELDING—Air Reduction Sales Co. has available an eight-page reprint entitled, "Will Inert-Gas Metal-Arc Save Money on Mild Steel?" Graphs and cross-section photos of weld deposits are given along with results of weld tests.

4 BIN GATES AND VALVES—Stephens-Adamson Manufacturing Co. has released Bulletin 1252 describing and illustrating its complete line of bin gates and valves. Dimensions and line drawings are included.

5 BOILERS—Orr & Sembower, Inc. has released Bulletin 1219 describing Powermaster packaged automatic boilers. Advantages, typical installation photographs, drawings, cutaway views and specifications are included.

6 BULK PACKING SYSTEM—Richardson Scale Co. has offered a 16-page bulletin, No. 0153, describing and illustrating its bulk packing and handling system. The loading, packing, strapping and unloading processes are given in detail.

7 CEMENT COLORS—Landers-Segal Color Co. has issued a leaflet giving suggestions for the use of Lansco cement colors along with a list of available colors.

8 CHAIN—Chain Belt Co. has released Bulletin 53-110, a 57-page catalog on Rex cast and steel chain, cast tooth sprockets, belt conveyor idlers, and spray nozzles. A pictorial index, chain listings and prices, dimensions, and chain attachment lists are also included.

9 CIRCUIT BREAKERS — Westinghouse Electric Corp. has brought out Booklet B-5456 discussing the application of AB-1 circuit breakers. Design, operating details, and a selection-data chart are included.

10 COMPRESSOR—Joy Manufacturing Co. has issued Bulletin A-44 covering the WGO-9, oil-free compressor. Photographs, section drawings, dimensions and specifications are given.

11 CONCRETE—Calcium Chloride Institute has available Bibliography No. 13 on "Calcium Chloride in Concrete." It is intended as a complete source of references on the effects of calcium chloride on properties of portland cement and concrete. The 62-page listings cover the period from 1885 to 1952.

12 CONTROLLERS — Minneapolis-Honeywell Regulator Co., Brown Instruments Div., has released Catalog 1053, describing indicators and controllers. Operation, specification and application data are given.

13 CONVEYORS—Stephens-Adamson Manufacturing Co. has issued a conveyor catalog, Vol. 205, giving typical application photographs and descriptions of various type conveying systems. A schematic layout of a zipper conveyor installation is also given.

14 CRANES—Bedford Foundry & Machine Co., Inc. has released a catalog describing its line of overhead electric traveling cranes. Specifications and structural and mechanical features are also given.

15 CRAWLER TRACTORS—Allis-Chalmers Manufacturing Co., Tractor Div., presents four diesel-powered crawler tractors in Catalog MS-648. Construction details, cutaway pictures, and illustrations of typical job applications are given.

16 DRILL CORES AND BITS—Koebel Diamond Tool Co. has issued a booklet describing and illustrating its diamond cores and drill bits. A list of standard inserts for field fabrication is also included.

17 DUMP BODIES—Marion Metal Products Co. is distributing Vol. I, No. II of "Dump Body Business." Descriptions and photographs of its various dump bodies are given, as well as sales advice, contracting projects and new design features.

18 DUST CONTROL — Rees Blow Pipe Manufacturing Co., Inc. has issued Bulletin 29 describing and illustrating dust arrestors. Construction features, standard sizes and dimensions are given.

19 ELECTRODES—Alloy Rods Co. has published an eight-page technical bulletin, No. AR53-18, giving technical developments in the low-hydrogen electrode field. The effects of hydrogen and basic slag, control of hydrogen, welding procedures, and applications are also given.

20 ELECTRONIC WEIGHING — Baldwin-Lima-Hamilton Corp. has brought out Bulletin 4106, explaining how to weigh tank, bin and hopper contents electronically with Baldwin SR-4 load cells. Installation design and a questionnaire to aid in specifying proper weighing equipment are included.

21 FASTENING TOOLS — Olin Industries, Inc., Ramset Div., has published a 28-page application manual giving the advantages of its powder-actuated tools and fasteners for fastening steel to concrete, wood to concrete or steel, etc. Selection tables for the proper type fastener and powder charge for various receiving materials are included, as well as illustrations of the tools, fixtures, couplings and accessories.

22 FORK LIFT TRUCKS—Clark Equipment Co., Industrial Truck Div., has published a 16-page booklet describing and illustrating an experimental model, the X-70 fork truck. Schematic sketches point out construction details and a questionnaire on the model is included. Various types of fork lift trucks, electric, gasoline, diesel, etc. are also described and illustrated.

23 FORK TRUCK—Baker-Lull Corp. has released literature on the Forkloader. Applications and features of the four-wheel-drive equipment and specifications are given.

24 FRICTION CLUTCHES — Morse Chain Co. has brought out an illustrated engineering data sheet, Form S31-53, describing the line of torque-limiting slip-type friction clutches. Dimensions and capacities are also included.

25 HARD FACING—Cleveland Hard Facing Inc. has published a booklet on lowering maintenance and replacement costs through the use of hard facing methods. The types of products and industries served are described.

26 HARD-FACING—Mir-O-Col Alloy Co. has released a 52-page brochure giving a comprehensive and analytical study of hard-facing, its application and wear-resisting qualities. The effect of heat on metals, what metals can be hard-faced, etc. are given.

27 HOSE COUPLINGS — Hose Accessories Co. is distributing a booklet entitled, "Dangers Under Pressure." Hose couplings for air, gas and steam hoses are illustrated and described and hose installation data is also included.

28 INDUSTRIAL BELTING—Boston Woven Hose & Rubber Co. has issued a 48-page question and answer style, technical manual on transmission, conveyor and elevator beltings. Tables, charts and diagrams are also given.

29 INSTRUMENTS — Minneapolis-Honeywell Regulator Co., Industrial Div., has prepared a booklet describing Honeywell's Industrial Div. or Brown Instrument Co. The division's various instruments, services to industry, etc. are described.

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30 JAW CRUSHERS—Gruendler Crusher & Pulverizer Co. has issued bulletins, No. BR-5, No. 2 and BR-35-1, describing and illustrating its portable primary jaw crushers. Specification charts and a diagram of a two-plant unit are included.

31 MACHINERY PARTS—The Euclid Road Machinery Co., Parts Dept., has released a 24-page booklet explaining the various functions and operations within the Parts Department. Photographs are also given.

32 MATERIALS-HANDLING EQUIPMENT —Barrett-Cravens Co. has published Junior Catalog No. 535, describing and illustrating materials-handling equipment. Lift trucks, elevators, dollies, etc. are listed.

33 MEASURING EQUIPMENT — General Electric Co. has announced a revised edition of its 64-page measuring equipment catalog, GEC-1016A, containing data on more than 115 testing and measuring devices for laboratory and production line work. Illustrations, specifications, application data and descriptions are given.

34 MINING TOOLS—General Electric Co., Carboloy Dept., has published a four-page supplement, CM-112, to catalog CM-110, which describes various mining tools, an extra-heavy-duty bit, a prong-type roof bolt drill for wet or dry drilling, and an auger drill. Specifications are included.

35 MIXER CONSISTENCY RECORDER—Minneapolis-Honeywell Regulator Co., Industrial Div., has issued an instrumentation data sheet, No. 3.6-7, describing the mixer consistency recorder for measuring power consumption and for producing a graphic consistency build-up record.

36 MOTOR STARTERS — Allis-Chalmers Manufacturing Co. has issued Bulletin 14B-7132A, describing and illustrating size 0-3 a-c across-the-line motor starters. Various types, operating arrangements and enclosures are described, as well as push button control stations. A motor voltage and motor maximum hp. table are also included.

37 MOTORS AND GENERATORS—Louis Allis Co. has announced a 16-page bulletin, No. 1450, describing and illustrating its line of d-c motors, ½ to 300 hp., and d-c generators, ¾ to 250 kw. Cutaway drawings and diagrams are given as well as motor-starting information and d-c adjustable speed applications.

38 OIL VALVES—Hauck Manufacturing Co. has released Catalog 707A describing and illustrating the self-cleaning, metering oil valves. A flow curve for light oil and a cross-sectional view of the oil valve are also given.

39 OXYGEN ANALYZER—Arnold O. Beckman, Inc. has published Bulletin 108, describing oxygen measurement and control through the use of the Model F-3 oxygen analyzer.

40 POWER SHOVEL—Marion Power Shovel Co. announced Bulletin 408 describing and illustrating the 111-M Ward-Leonard electric shovel. Typical job applications are pictured and its features are listed.

41 POWER TOOLS—Syntron Co. has released Catalog 537 illustrating and describing its line of portable power tools. Descriptive information and specifications on electromagnetic hammers and drills, portable electric drills, screwdrivers, grinders, etc. are given. Concrete vibrators and gasoline hammer paving breakers are also described.

42 PRESSURE AND VACUUM GAUGES—Minneapolis-Honeywell Regulator Co., Industrial Div., has released a 32-page catalog, No. 7001, with details about types of pressure and vacuum gauges. Indicators, recorders, and pneumatic transmission are also described and illustrated.

43 PROTECTIVE HOODS—Mine Safety Appliances Co. has released a bulletin, No. 1000-1, describing and illustrating dust, chemical and paint protective hoods.

44 PUMPS—Nagle Pumps, Inc. has released Bulletin 952 describing and illustrating various type pumps including automatic priming, single stage, side suction, dry pit, wet pit, etc. Application data and drawings are included.

45 ROCK-DRILL BITS—Brunner & Lay, Inc. has listed and described rock-drill bits in a 24-page booklet. Illustrations of clay digging, asphalt cutting and pavement breaking tools are given as well as pneumatic star drills and chipping hammer tools. Dimensions and weight tables are also given.

46 ROLLER CHAIN—Dodge Manufacturing Corp. has released Bulletin A-624, on Taper-Locks, sprockets and Dodge roller chain. Cross section drawings, specifications, sprocket bushing and selection data are also given.

47 RUBBER BEARINGS—Lucian Q. Moffitt, Inc. has available a catalog describing the uses and advantages of B. F. Goodrich Cutless rubber bearings in industrial equipment. Engineering data, cross-section drawings, dimensions, charts and tables are included.

48 SCRAPERS—Allis-Chalmers Manufacturing Co., Tractor Div., has issued a 12-page illustrated catalog on its line of seven pull-type scrapers. Specifications, over-all dimensions and features are given.

49 SUMP PUMP—The Galigher Co. has made available Bulletin SP-53 describing and illustrating an acidproof sump pump. Construction, installation, operation and servicing details are given. Drawings and a parts list are also included.

50 TRACTOR—Caterpillar Tractor Co. has published an eight-page booklet, Form 30664, describing and illustrating the various applications of the DW10 rubber-tired tractor.

51 TRACTOR-LOADER — Tractomotive Corp. is distributing a folder describing and illustrating the TL-10 Tracto-Loader. General dimensions, specifications and an accessory equipment list are also included.

52 V-TYPE ENGINES—Nordberg Manufacturing Co. has published Bulletin 197 giving construction and operating data on four-cycle Supairthermal V-type stationary or marine engines. Dimensional line drawings and a schematic cross-sectional drawing are also included.

53 VARIABLE SPEED MOTORS—U. S. Electrical Motors, Inc. has published Bulletin 1797, describing and illustrating variable speed motors. Colored illustrations of motors, mechanical features, remote controls, etc. are included in the 16-page bulletin, as well as color photographs of various steps in motor manufacture.

54 VERTICAL PUMP MOTORS—The Louis Allis Co. has published Bulletin 1250 covering hollow and solid shaft vertical pump motors. Various types of enclosures are shown as well as varied industry uses. Cutaway illustrations and phantom drawings also show details.

55 VIBRATING SCREENS — Deister Machine Co. has released Bulletin 55 giving complete information on its heavy-duty types ETP and ETU high-speed vibrating screens. Operational features, performance characteristics and various motor mountings are given as well as the full range of screen sizes.

56 WELDING — Allegheny Ludlum Steel Corp. has released a motion picture, "Resistance Welding of Stainless Steel," which discusses spot, seam, projection and butt welding. The 22-min., 16 mm., sound and color film is available on free loan from the corporation at 2020 Oliver Bldg., Pittsburgh 22, Penn.

57 WIRE ROPE—Macwhyte Co. has published a booklet giving wire rope recommendations for contractor's equipment. Drawings show various equipment uses.

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Recover Fine Sand

(Continued from page 75)

gravel daily, an increase of 25 percent over the former plant. The company owns 2200 ft. of railroad loading track and a half mile of 50 ft. roadway paralleling the Santa Fe tracks to the east of the plant. The office and warehouse and storage yard is a mile east on the western fringe of the new industrial area of the Santa Fe railway known as the Turner Industrial District which is already partially occupied by a substantial number of heavy industrial plants. The office site occupies four acres. Delivery equipment consists of four company owned 10-ton capacity trucks, and additional facilities of hauling companies that operate 20-ton trucks.

The American Sand & Material Co., was originally established by H. B. Thompson and associates. Jas. E. Siler, who now heads the company, has been with the company practically since its inception. He acquired control in 1944. W. W. Siler is plant superintendent.

Lime Manufacture

(Continued from page 104)

by "C" of Fig. 14, but good lime can not be made, nor much lime either, in this fashion.

When stone or lime are of a friable nature, or of a fusing, sintering kind, then rather than charge it as large stone to high kilns it is best to reduce it to a medium size. Then it should be screened into separate sizes, these sizes calcined in separate kilns under conditions of low kiln load and lower kiln temperature, but still at higher capacity and with lime drawn gently without poking and at frequent intervals. A minimum of fines will thus be produced and a much better lime made, even from lower quality rock.

Availability of surface depends also on manner of injection of the combustible past the upcoming current of air; that is, the extent and direction of the penetration of combustible gas and its distribution in the bed. But this is a separate problem, entailing vector analysis of streams, and so are the factors of ignition and flame propagation as well as the terminal state of combustion.

Then there is the wall effect. Along the wall for the distance of the radius of the stone the void space may be double and within this the upstream velocity also double. In what manner the slope of the wall may affect this is shown by sketches "A," "B" and "C" of Fig. 14. When there is an excessive wall flow the availability of the internal bed surface is reduced. In mixed-feed kiln practice, they often control this by charging fines against the wall without coke. In gas-fired kiln practice this is not possible and other provisions must be kept in mind including that of flow deflectors.

Separate from this is the question as to what is the economical extent of surface. Evidently surface can be

in excess to no good purpose and likely harmful. But what would or would not be justified would depend on whether the fuel costs $5, $15, or $30, and on other economic factors.

In closing this article we may repeat, the smaller the stone is the greater the surface and calcining rate is; but with this, also, the flow resistance becomes greater and the natural diffusion is less, entailing ever greater precautions for obtaining equilateral gaseous distribution.

(To be continued)

Chemical Stone

(Continued from page 89)

mer mill product is returned to the screen. The fines from the lower deck are carried back by belt conveyor to the first belt in the plant from the primary crusher. By this set-up, it is possible to get additional fines (which are desired) in the flexible base stone. (minus 1½-in.). The flow diagram gives the essentials of the plant's layout.

The company has its own truck hauling equipment, using 12 to 15-cu. yd. cable-dump trailers. Most of the fleet are G.M.C. diesels with two being Fords. However, a considerable portion of the stone is shipped by rail. Koehring Dumptors are used for stockpile work.

James P. McDonough is president of McDonough Bros., Inc., and John S. McDonough is vice-president. Dan P. McDonough is secretary-treasurer. The plant is located on the Fredericksburg Road north of San Antonio.

Labor Relations Trends

(Continued from page 55)

houses substantial advantages which undoubtedly affected their conditions of employment.

"Obviously the company's ownership and control contribute to this result. The extent of its influence has of course been curtailed by the reduction in the number of company houses from 150 to 65 during the period of the company's ownership. Nevertheless it is still substantial; and it bears directly on the crucial question in the case, since the retention by the company of a sufficient number of dwellings to house 25 percent of the employes near the plant in an area where houses are hard to get gives the company a means of affecting the living conditions of a large part of its working force through the power of granting or withholding the privilege and of fixing of terms upon which it may be exercised. Under the circumstances of this case the matter is of sufficient importance as to require its submission to the process of collective bargaining. The order of the Board will be

"Enforced."

•

D. S. CRANE, Osceola, Ark., producer of ready-mixed concrete, was recently granted a $48,000 credit by the Reconstruction Finance Corp.

Cut Operating Costs

(Continued from page 77)

age unit, and it is a 4-cu. yd. dump body on a Ford chassis.

The rails of the I.G. & N.R.R., a subsidiary of the Missouri Pacific, serve the plant, and switching facilities provide for cars to go through the plant and under bins. The company has its own 50-ton Baldwin steam locomotive for switching. The company owns about two miles of standard gauge switching facilities. About 40 percent of the plant's output is shipped by rail.

The company has a well equipped shop, which includes a portable P & H 30-amp. electric welding outfit. The company's modern office building is also at the plant site.

The company has found that having a modern, air-conditioned office, away from the more thickly populated sections, is a decided sales asset, for contractors, highway engineers, etc., who find they have a little time to visit, often drive out to the plant office. These little friendly, informal visits all add up to better mutual understanding, and adds a personal touch to the handling of business transactions.

Central Texas Sand and Gravel Co. is under the management of Burt J. Collins with James E. Jones, superintendent. J. D. Nokeley is office manager.

The head offices of Gifford-Hill & Co., Inc., are in Dallas. J. Rutledge Hill is president of the company, H. M. Lacy and F. R. Gifford, vice-presidents, and R. E. Wynne, secretary-treasurer.

Vermiculite Booklet

THE VERMICULITE INSTITUTE recently announced the publication of a 16-page booklet entitled, "Recommended Building Code Requirements for Vermiculite Plastering, Acoustical Plastic, Fireproofing and Concrete." The recommendations are based on standards of the American Standards Association, the American Society for Testing Materials and the Vermiculite Institute. The booklet was prepared as a convenient reference for officials and agencies responsible for approval of materials and construction or for writing or revision of building codes. It is also of interest to fire insurance rating bureaus as it covers the fire resistance of combustible and incombustible constructions protected with vermiculite products. It is available from Vermiculite Institute, 208 S. LaSalle St., Chicago 4, Ill.

Director of Development

DR. CHRISTIAN H. AALL has been named director of development of the phosphate division of Monsanto Chemical Co., St. Louis, Mo. Donald A. Roper has been appointed assistant research director in the Anniston, Ala., laboratories of the research department of the division.

Midwest Meeting

(Continued from page 128)

cent strikes that have affected the industry in St. Louis, New York City, Kansas City and other areas. This year has been the worst strike year in the history of the industry. He mentioned some of the concessions given labor including contributions to welfare funds, increased vacations with pay, etc. Some of the operators were penalized with stiff demurrage charges for cement cars because the strikes came without warning.

About welfare funds, Mr. Ahearn cautioned that these contributions, once started, can grow to serious proportions. In New York, the strikers are seeking 14 paid holidays (they have 12 now) and in Kansas City there are demands for three days off for family funerals.

Unless companies in the industry work together, Mr. Ahearn believes they will be lost in dealing with unions. The practice of group bargaining is growing, which he believes to be absolutely essential. He reminded that the association is keeping its members posted with data on wages paid and other information to help guard against making bad decisions in dealings with unions.

He talked briefly about the group insurance plan which is now available to member companies at low cost. The principle of percentage depletion is under attack and the issue will soon come up again in Congress. Mr. Ahearn believes the sand and gravel industry is entitled to 15 percent depletion because of serious shortages of sand and gravel that are rapidly developing but he said that every effort must be made first of all to maintain the 5 percent depletion now in effect.

The sand and gravel industry is exempt from renegotiation of contracts but there has been no success in having the exemption apply to ready-mixed concrete.

The subject of merchandising of ready-mixed concrete and suggested sales agreements with protective clauses to fix responsibilities will be emphasized at the N.R.M.C.A. convention to be held in Chicago in February, 1954.

Mr. Ahearn said that it is now considered legal to meet lower prices in good faith according to a Federal Trade Commission statement of June 16, which is a reversal from the ruling that has prevailed, that questioned the legality of freight absorption.

Looking into the future, Mr. Ahearn said that a premium on good management will be essential in the years ahead, and that individuals will have to prove their right to be classed as executives. No avoidable expense will be tolerated and particularly insofar as accidents are concerned. Every time a state legislature meets, he pointed out, accidents become more expensive and it will be mandatory that steps be taken to prevent accidents.

Lime Operating Meeting

THE NATIONAL LIME ASSOCIATION has announced the program of the annual meeting of its operating division which will be held October 12-14, 1953, at the Tutwiler Hotel, Birmingham, Ala., the first such meeting of national scope to be held in the "Deep South."

This is expected to be an outstanding meeting as Shelby County, Ala., is the fourth largest lime producing area in the United States, and features modern, large-capacity, vertical kilns of various types and a new, completely modern, rotary kiln lime plant which will be included in the visitation tour. The program committee, consisting of M. A. Rikard, Southern Cement Co., Birmingham, Ala., chairman, Alan B. Cheney, Cheney Lime & Cement Co., Birmingham, H. L. Hammond, Keystone Lime Works, Inc., Keystone, Ala., and George L. Scott, Jr., Alabaster Lime Co., Siluria, Ala., has announced the convention program as follows:

Monday, October 12

The opening day of the meeting will be devoted to plant visitations for which buses have been chartered. This inspection tour will include the following plants: Southern Cement Co.'s North Birmingham slag cement plant, featuring the use of hydrated lime in mortar materials; Keystone Lime Works, Inc., Keystone, Ala., plant; Alabaster Lime Co., Alabaster, Ala., plant; Cheney Lime and Cement Co., Landmark, Ala., plant; and Southern Cement Co.'s lime plant at Roberta, Ala. The group will be luncheon guests of Keystone Lime Works, Inc. In the evening, the above companies whose plants were visited will be joint hosts to the group for a "southern style" barbecue.

Tuesday, October 13

The meeting will have K. L. Hammond, secretary-treasurer, Keystone Lime Works, Inc., as presiding officer. Following the opening address by F. J. Collins, The Kelley Island Lime and Transport Co., Cleveland, Ohio, operating division chairman, will be a series of panel discussions. The first forum will be on the subject "Quarrying, Mining and Preparation of Stone for Lime Burning," with J. V. Andrews, The Kelley Island Lime and Transport Co., serving as moderator, assisted by panel members, L. E. Smith, The Kelley Island and Transport Co.; H. E. Gustafson, National Gypsum Co.; D. M. Kerr, Kaiser Aluminum & Chemical Corp.; and J. G. Wilson, Warner Co.

A forum on "Product and Quality Control in the Lime Industry," will be led by L. N. Carmouche, The Dow Chemical Co., assisted by W. J. Barrett, New England Lime Co.; Donald G. Hamme, National Gypsum Co.; L. John Minnick, G. & W. H. Corson, Inc.; and G. W. Talbot, Imperial Chemical Industries, Ltd., Lime Div., Derbyshire, England.

A forum covering "Lime Burning of Dolomitic and High-Calcium Stone in Rotary and Vertical Kilns," will be led by A. C. Hewitt, Warner Co., assisted by Casper Arndt, H. E. Millard Lime and Stone Co.; Victor J. Azbe, Azbe Corp.; W. V. Hammond, Keystone Lime Works, Inc.; and Her-

M. A. Rikard, Southern Cement Co., Birmingham, Ala., program chairman, N.L.A. operating meeting

mann Lange, Hohenlimburger Kalkwerke, Hohenlimberg, Germany.

The closing session will be a forum on "Safety in the Lime Industry," with Lea P. Warner, Jr., Warner Co., serving as panel moderator, and the members of the association safety committee as panel members.

The social activities of the evening will feature a cocktail party, dinner and dance at "The Club."

Wednesday, October 14

This session will open with a panel discussion on "Lime Consumption as Applied by Large Users." C. C. Loomis, New England Lime Co., will be the panel moderator. Other panel members will be Hayden Brooks, Blue Diamond Co., representing the building industry; H. O. Tittel, plant manager, Monsanto Chemical Co.; and representatives of Gulf States Paper Co., Tuscaloosa, Ala., and Tennessee Coal & Iron Div., U. S. Steel Corp.

Following the panel discussion will be a short business meeting, including general announcements, the election of the 1954 operating division program chairman, and a discussion of manufacturing costs in the lime industry, with Robert S. Boynton, general manager, presiding.

Awarded Honorary Degree

HOWARD P. EELLS, JR., president of Basic Refractories, Inc., Cleveland, Ohio, who conceived and founded Basic Magnesium, Inc., Henderson, Nev., was awarded an honorary Doctor of Laws degree by the University of Nevada at commencement exercises in Reno on June 8.

MANUFACTURERS NEWS

Davey Compressor Co., Kent, Ohio, has announced the appointment of Paul H. Nast as manager of the rock drill division. He will be in charge of sales, engineering and manufacture of the firm's complete line of air tools for quarries, mines and construction. Mr. Nast has had many years of experience in the compressed air field. Prior to joining Davey he was product manager of the air tool and rock drill divisions of The Worthington Corp. He also served as design and field engineer with the Chicago Pneumatic Tool Co. and spent 14 years with Sullivan Machinery Co. on construction and mining machinery.

Paul H. Nast

Oliver United Filters Inc., Oakland, Calif., announces the acquisition for manufacture, sales and service of all rights in connection with the Centriclone, from the former owners, Equipment Engineers, Inc., San Francisco.

The Timken Roller Bearing Co., Canton, Ohio, has announced the death on August 10 of L. M. Klinedinst, formerly vice-president in charge of sales and director, who retired in 1948. He had been associated with the company since 1905.

Sintering Machinery Corp., Netcong, N. J., advises us of an omission in our announcement in the July issue. The sales representatives listed were for the Transportometer division of the company.

H. K. Porter Co., Inc., Pittsburgh, Penn., has appointed Russel J. Dickson as general sales manager of the Leschen wire rope division. He was formerly Chicago district manager.

Bemis Bro. Bag Co., St. Louis, Mo., announces the appointment of W. F. Mulvaney as supervisor of multiwall paper bag sales. Formerly sales manager of the multiwall paper bag plant at Peoria, Mr. Mulvaney succeeds C. W. Akin, who has been made assistant director of sales. R. L. Baker, Jr., formerly assistant sales manager, succeeds Mr. Mulvaney as sales manager at Peoria. K. W. Koechig has been made supervisor of small paper bag sales.

W. F. Mulvaney

Mr. Mulvaney joined Bemis at Peoria in 1939 as a clerk in the billing

department and later became a sales correspondent. He was appointed factory representative in 1945, became assistant sales manager in 1950, and sales manager in 1951.

Robert G. Evans Co., Kansas City, Mo., announces that G. P. Scott has resigned as president of the Eveready Briksaw Co., Chicago, Ill., to become a full partner in the Evans company, manufacturers of the "Target" line of masonry saws and blades.

Pioneer Engineering Works, Minneapolis, Minn., announces that Carl R. Rolf has been appointed vice-president in charge of sales. Mr. Rolf joined Pioneer as district sales representative covering the western states shortly after the firm bought the gravel crushing business from Caterpillar Tractor Co., at which time he was serving as Caterpillar dealer in Minot, N. D. Previously Mr. Rolf was factory sales and service representative for the Russell Grader Co. in the northwest area before it was sold to Caterpillar Tractor Co. From 1940 until the present, Mr. Rolf has served Pioneer as assistant sales manager, assistant secretary and sales manager, and as vice-president and sales manager.

Carl R. Rolf

The Dorr Co., Stamford, Conn., announces that J. Delano Hitch, Jr., executive vice-president, has been elected president of the company. He succeeds E. R. Ramsey who becomes vice-chairman of the board and consultant. Dr. John V. N. Dorr, founder of The Dorr Co., is chairman of the board. Mr. Hitch joined the company in 1927 as a field engineer. In 1946 he was elected a director of the company and vice-president in charge of sales. He has been executive vice-president since 1952. Mr. Ramsey became associated with the company in 1914 in Denver as junior engineer. In 1935 he was made a director and member of the executive committee. He became vice-president in charge of engineering in 1944, operating vice-president in 1946 and president in 1949.

E. R. Ramsey

J. Delano Hitch, Jr.

B. F. Goodrich Co., Akron, Ohio, announces that Arthur Kelly, vice-president, has been named president of the tire and equipment division. Joseph A. Hoban has been appointed

vice-president of replacement sales for the division; E. F. Tomlinson, vice-president of equipment sales; and J. E. Gulick, vice-president of manufacturing. Clyde O. DeLong, formerly general sales manager, has been named president of the industrial products division. Robert V. Yohe has been appointed vice-president of sales for the division; and Rollin D. Hager, vice-president of manufacturing.

Caterpillar Tractor Co., Peoria, Ill., has announced the following promotions and appointments: R. J. Loskill, manager of sales development division; W. E. McCoy, manager of sales training division; J. G. Tacker, assistant sales manager in the eastern sales division; and H. J. Hunkele, assistant manager of the central sales division. W. F. Jordan has joined Ohio Machinery Co., Caterpillar dealer in Cleveland; and Roy McCluskey, formerly vice-president of R. G. LeTourneau, Inc., has joined general sales department as sales administrative assistant.

Chain Belt Co., Milwaukee, Wis., announces that L. B. McKnight has been elected president and chief executive officer to succeed J. C. Merwin who becomes chairman of the board. Mr. McKnight has been executive vice-president since 1948.

Western Precipitation Corp., Los Angeles, Calif., announces the appointment of Robert J. Plass to the sales staff as liaison engineer for the cement industry. He was formerly assistant chief engineer.

Hercules Powder Co., Wilmington, Del., has announced the appointment of Clarence W. Ballard as director of sales for the explosives department. He succeeds LeRoy Keane who has been named assistant general manager of the department. Jack D. Hayes, Jr., has been named director of operations to succeed Harry V. Chase who has also been named assistant general manager of the explosives department. Mr. Ballard, a native of Ward, W. Va., joined the Hercules sales and service division in Pittsburgh in 1939. He was assigned to sales work and made his headquarters in Columbus, Ohio, until his appointment as assistant manager of the Pittsburgh office, later becoming manager. Mr. Hayes joined the company in 1937 and has been manager of explosives operation since 1947.

Clarence W. Ballard

Leeds & Northrup Co., Philadelphia, Penn., has announced the election of I. Melville Stein as president to succeed Charles S. Redding who becomes chairman of the board. D. H. Schultz has been named to succeed Mr. Stein as executive vice-president in addition to his duties as treasurer, and George W. Tall, Jr., vice-president, has also been appointed secretary.

Chain Belt Co., Milwaukee, Wis., announces the purchase of Shafer Bearing Corp., Downers Grove, Ill., which will operate as the Shafer bearing division. R. P. Tennes, former president, becomes division manager; M. J. Tennes, Jr., factory manager; H. E. Tennes, sales manager; A. H. Williams, chief engineer; H. R. Lucas, controller; Gordon Terris, director of distributor sales.

International Harvester Co., Chicago, Ill., has established an industrial power division sales department at Melrose Park, Ill., with I. P. Payne as manager of sales, and W. M. Holland and C. E. Jones, assistant managers of sales.

Gould-National Batteries, Inc., Trenton, N. J., has announced the death on July 6 of Fred G. Teufel, regional sales manager in Cleveland, Ohio.

Bradley Pulverizer Co., Boston, Mass., announces the appointment of Peter B. Bradley as general manager of the Allentown plant. He succeeds the late William A. Gibson.

Marion Power Shovel Co., Marion, Ohio, has appointed Kern-Limerick, Inc., Little Rock, Ark., as distributor in Arkansas.

CONCRETE PRODUCTS

A SECTION OF ROCK PRODUCTS

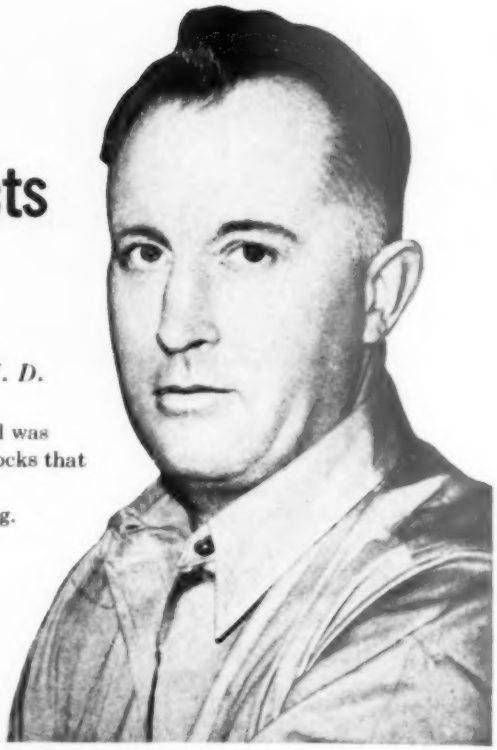
CONCRETE UNITS · READY-MIXED CONCRETE

The Carter-Waters Corp., Kansas City, Mo., manufactures many concrete specialties

"I would like you to know

what Duraplastic* has done to improve my products and save money"

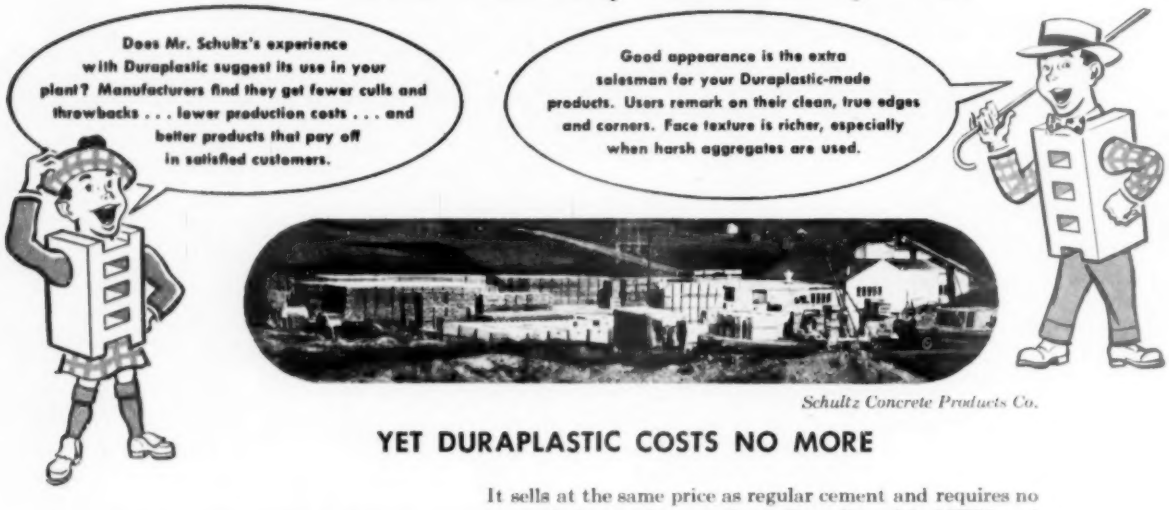
says **KENNETH A. SCHULTZ**
of Schultz Concrete Products Co., Minot, N. D.



"For years I used different brands of cement, mostly 'regular,' and was troubled by poor feeding of the mix in the block machine, fresh blocks that would not stand the least jar when they were green, and a large percentage of culls off the racks when we cubed for yard stockpiling.

"The last two years I have used 100% Duraplastic and find the mix feeds through the machine without trouble. Duraplastic makes a mix that sticks together, almost eliminating breakage. And our culls in unloading and cubing are so few now that it would be hard to figure a percentage." Mr. Schultz also finds that blocks made with Duraplastic air-entraining portland cement have greater resistance to passage of water.

and here's what "Thrifty" and "Nifty" say:



Schultz Concrete Products Co.

YET DURAPLASTIC COSTS NO MORE

It sells at the same price as regular cement and requires no unusual changes in procedure. Complies with ASTM and Federal Specifications. For descriptive booklet, write Universal Atlas Cement Company (United States Steel Corporation Subsidiary), 100 Park Avenue, New York 17, N. Y.

OFFICES: *Albany, Birmingham, Boston, Chicago, Dayton, Kansas City, Minneapolis, New York, Philadelphia, Pittsburgh, St. Louis, Waco.*

*"Duraplastic" is the registered trade mark of the air-entraining portland cement manufactured by Universal Atlas Cement Company.

ATLAS® **DURAPLASTIC**
AIR-ENTRAINING PORTLAND CEMENT

CP-D-153

Makes Better Concrete at No Extra Cost

INDUSTRY NEWS

Wins Display Award

THE NATIONAL CONCRETE MASONRY ASSOCIATION was awarded first-place honors in recognition of its products display at the 85th annual convention of the American Institute of Architects, recently held in Seattle, Wash.

N.C.M.A. winning exhibit featured a decorative concrete masonry wall in background and, left, a partially completed wall showing methods of tying block together with reinforcing steel

In selecting the best products display, judging was based on the products story, the application and end results. The N.C.M.A. booth, which was both attractive and informative, had a background wall of concrete masonry, finished in pastel paints, indicating the decorative possibilities of the material. A partially completed side wall showed methods of tying block together with reinforcing steel. Members of the N.C.M.A. in the Seattle area cooperated to produce this display for the association.

Expands Block Plant

CINDER PRODUCTS CO., Jerome, Idaho, has issued a contract for the construction of a 60- x 60-ft. retail business and administration building, which will be located adjacent to its present plant site and will serve as an outlet for the company's products and accessory building materials. The building will also have a separate room for house planning. When it is completed, about June 1, "open house" will be held to acquaint the public with the firm's new division, which will be known as Volco Builder's Supply.

Advertising Stunt

THOMAS CONCRETE PIPE CO., Oklahoma City, Okla., at a recent "Home Builders' Show" in Oklahoma City, awarded two complete barbecue pits as booth prizes. The company furnishes complete plans and materials for building an outdoor barbecue pit and, according to officials of the firm, the crowds attending the show expressed much interest in the plan. The pit, which is 28 in. high, with a 5-ft. chimney, is built entirely of Thomas Featherlite concrete block and is trimmed with red patio block, both of which are produced at the company's Oklahoma City, plant.

Cover Picture

CARTER-WATERS CORP., Kansas City, Mo., is widely known as a producer of lightweight aggregates as well as concrete block, but it also manufactures many concrete specialties in large volume. The company has pioneered in the production of floor slabs, joists, beams, purlins, lintels, guard rail and railroad signal foundations.

In this issue is an article describing a demonstration test by this company of precast, prestressed concrete beams made with Haydite aggregate designed for highway bridge structures. This is an important development which will broaden the market for concrete structural members.

Concrete Company Sold

WILLISTON CONCRETE PRODUCTS CO., Williston, N.D., has been sold to F. J. Butler and Associates, owner of Butler Construction Co., Grand Forks, N.D. Former owners of the plant, Harry Lieb, Bob LeSeur and Russ Bartels, will continue to operate the plant for the new owner. William Welsh of Grand Forks will become resident manager of the Williston plant.

The Williston company has expanded its operations each year since its organization in 1947. Concrete block and ready-mixed concrete are produced.

Ownership Change

BUFFALO GRAVEL CORP., Buffalo, N.Y., large producer of ready-mixed concrete, has been purchased by a group of local businessmen and several plant employes. A new corporation has been formed which will operate the plant under the same name. Edgar B. Maloney, formerly vice-president, has been elected president, with Carlton J. Lewis as vice-president. The company operates a fleet of 55 trucks, of which 45 are transit-mixer trucks.

Ready-Mix Plant

O. K. COAL AND CONCRETE CO., Zanesville, Ohio, has opened a ready-mixed concrete plant. J. W. McClelland, owner of the business, started as a trucker in 1932 and formed a partnership to create Snyder-McClelland Co. In 1940 he opened the O. K. Coal yards, which are adjacent to the new ready-mixed concrete plant.

SUPERIOR CONCRETE PRODUCTS CO., Pocatello, Ida., has announced the change of its firm name to Western Pumice Co., Inc. Announcement was also made that the firm has increased its capitalization from $10,000 to $20,000. The company, which produces cinder and pumice block and other concrete products, is owned by Otis Wooters, J. D. Young and Ora Young, all of Pocatello.

AMERICAN-MARIETTA CO., Marietta, Ohio, has announced the acquisition of Concrete Products Co. of America which operates plants in Pittsburgh, Pottstown and Williamsport, Penn. Concrete Products Co., which is a volume producer of concrete pipe and prestressed bridge sections, will be merged with Lamar Pipe and Tile Co., also recently acquired by American-Marietta.

BONA-FIDE CONCRETE CO., owned by Victor P. and Martin L. Saper, Jackson, Mich., recently began operation of a new ready-mixed concrete plant in Jackson. Plant facilities include five 3½-cu. yd. transit-mixer trucks and a Butler plant. Production is approximately 200 cu. yd. of concrete per day.

VALLEY BLOCK CO., Rexburg, Ida., has started operation of its new cinder block plant. Initial production is 2000 to 3000 block per day, which will be increased upon completion of the plant facilities. Roman block in colors are also produced. Ross Dunn and Frank Tanner are the owners and operators.

F. D. CONKLIN & SON, Richfield Springs, N.Y., recently completed construction of a ready-mixed concrete plant, which will serve the outlying districts of West Winfield, Bridgewater, Van Hornesville, Cooperstown and Cherry Valley areas.

A CONCRETE BLOCK PLANT has been established at New Leipzig, N. D., by Jakob Rosin, who recently purchased the plant and equipment from John Hintz, former owner of a block plant at Carson, N. D.

VIESKO SAND & GRAVEL, Mission Bottom, Ore., has added a ready-mixed concrete plant to its sand and gravel operations. The product is being marketed under the tradename of "Mix-Rite" concrete.

BRUCE DENNIS, Aberdeen, Wash., has purchased the ready-mixed concrete plant and property formerly owned by A. W. Hammond and E. H. Hazeltine, also of Aberdeen.

STAFFORD CONCRETE CO., Winnsboro, Texas, has been sold to Thomas M. Holden, Dallas, Texas. The company produces concrete tile, septic tanks, culverts and conduit pipe.

CANOLES CONCRETE PRODUCTS, West Juneau, Alaska, owned by B. C. Canoles, has started production of concrete sewer pipe. It is the first such plant in southeast Alaska.

That's the kind of service you can give with the Cook Bros.-Challenge, 6½ cu. yd. legal payload, Truck and Mixer combination, shown above. Eight (8) of these units operated by Consolidated Rock Products Company, Los Angeles, California, delivered 742 cubic yards of concrete in an eight hour shift (7 A. M. to 3 P. M.) to T-S Construction Engineers, Inc., contractor, during construction of a 3 level parking structure. The trucks were driven 2.4 miles through city traffic between batch plant and pouring site. What's more, there were a total of 9 separate pours of concrete on this job that were over 700 cubic yards delivered in an eight hour period.

It's performance like this that has put Challenge **out front** . . . get detailed information on the complete Challenge line NOW!

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Exclusive National Distributor For CHALLENGE TRUCK MIXERS... *Standard of The Industry*

John A. Mercier Brick Co., Dearborn, Mich., has converted completely from clay brick to slag concrete block. Modernize plant with high-production block machines, improved curing facilities, and material handling

By HUBERT C. PERSONS

Traveling hopper over 48-in. conveyor belt, 300 ft. centers. At the junction with the 48-in. covered conveyor belt, 200 ft. centers, inclining up to the plant there is a magnetic pulley to remove any iron in the material

REBUILT BLOCK PLANT

"A House of a Thousand Windows"

FROM A CLAY BRICK YARD to a completely modern concrete products plant, is the transformation undergone by the John A. Mercier Brick Co., Dearborn, Mich., in the 30 years since 1923. The company was established in 1923 to make common brick which were produced at the rate of about 120,000 per day for some ten years. In 1933 the Mercier company bought two Besser tamper machines and began producing 2500 to 3600 8- x 8- x 16-in. equivalent concrete units per day in addition to common brick production. The original tamper machines continued in use until the end of 1940.

Depletion of clay deposits was the initial cause of the change from brick to concrete, and in 1949 clay brick production was discontinued. Increasing demand for concrete block proved the wisdom of the change and is responsible for an extensive plant modernization program still under way.

Production is Increased

In January, 1941, the company installed its first Besser Vibrapac machine with a daily capacity of 5000 8-in. equivalent units. A year later the company bought a second Besser Vibrapac and discarded all the old tamper equipment. Acquisition of this second Besser machine doubled plant capacity to 10,000 block per day. Sand and gravel block were made the first few years. In 1936 the plant began making slag aggregate block, and expanded operations to include the manufacture of all types of reinforced concrete sills and lintels, a variety of special sizes and shapes including radial block, proscenium arch block and domed church windows made to architectural drawings. In present operations, blast furnace slag is the only aggregate used.

*Industrial public relations consultant, Chicago, Ill., for many years manager, Public Relations Bureau, Portland Cement Association

Showing part of the large "palletized" stock of block; plant and garage in the background

Two Types of Slag Units

Two types of slag units are now made, one with air-cooled blast furnace slag and the other with expanded blast furnace slag. The expanded slag block, 8- x 8- x 16-in., weigh 30 lb. and have a crushing strength of 1000 p.s.i. The air-cooled slag block weigh 37 lb. and have a crushing strength of about 1200 p.s.i.

The Mercier company also makes brick size units of which approximately 4,000,000 annually are sold in the Detroit area.

Since 1950 the company has marketed its product under the registered trade name of Mercrete for both block and brick-size units.

Reorganized in 1952

In April, 1952, the land, buildings, equipment and all assets of the John A. Mercier Brick Co. were purchased by the Edward C. Levy Co., operators of an adjoining slag producing plant.

View of the south side of block plant. In the foreground are the curing rooms, and in the background are the plant and conveyor supplying materials from yard stockpiles. Note ample window area to provide plenty of light and ventilation

The Mercier name was retained as were all the former Mercier employes. Officers of the reorganized company are Edward C. Levy, president; M. E. Harris, vice-president and James M. Tait, secretary and general manager. Duncan Mactaggart, who had been general superintendent of the Mercier operations for 26 years, continued in that capacity.

Plant Rebuilding Program

Following the reorganization of the company in 1952, a complete rebuilding and plant modernization program was launched. What is virtually a new plant was put into operation in March, 1953. Production equipment includes three Besser Vibrapac machines with capacities of 5000, 6200 and 7200 units daily (8- x 8- x 16-in. equivalents). The present production capacity of 18,400 block per 8-hour day will be increased by about 25 percent when faster electric equipment for moving block is installed, and cubing equipment and a completely hard-surfaced cubing area are in full operation. The plant is now operating a day and night shift.

Curing Methods

The remodeled plant has 16 curing rooms with sufficient capacity to handle 31,000 units a day. The block are cured with live steam at 170 deg. F. The curing cycle includes a 2-hour setting for green block after which the live steam is turned on for 2 to 2½ hours until the curing room reaches 170 deg. temperature. At that point the steam is turned off and the block are allowed to "soak" in the curing room for 8 hr. At the end of 8 hr. the heat and remaining steam are pulled from the curing room by exhaust fans, and the block racks are taken from the curing room to the cubing area by Clark lift trucks. The block are then cubed and allowed to continue drying in the 12-acre storage yard. The plant has under-cover storage space for 300,000 block and total storage space for up to two million.

All block delivered by the Mercier company must meet the dryness specifications of either the A.S.T.M. or the U.S. Corps of Engineers, depending on the wishes of the customer and the use to which the block are to be put. The A.S.T.M. specification calls for block with not to exceed 40 percent of the maximum absorption capacity of the block. The U.S. Corps of Engineers requires block with not more than 30 percent moisture.

During the heavy summer building season daily deliveries from the plant reach as high as 25,000 units. The largest proportion of block is used in industrial, commercial, school, and church construction. Not more than 25 percent of the plant's production has been used for residence work. Loading and stockpiling is all done by Clark lift trucks. Deliveries are made by 17 Ford trucks and semi-trailers.

Reduce Hand Operations

Every effort is made to eliminate hand operations, and to provide the most attractive and healthful working conditions for plant employes. The construction and layout of the building containing the batching plant, block machines and aggregate bins is an example of the care taken to provide healthful and pleasant working conditions. An imaginative plant man has dubbed this building "the House of a Thousand Windows." Actually, this building, which is 105 ft. long, 72 ft. wide and 63 ft. high, contains not only 1000 but 1200 windows. There are 400 windows on each side and 200 at each end. These windows provide unlimited light and sunshine for the plant men. A well-equipped modern garage, 60 x 50 ft., is attached to the larger building.

Close-up of 200 ft. long covered belt conveyor inclining up to the plant

The curing area is 132 ft. square with a 21 ft. center aisle for conveying racks to curing rooms. The cubing area contains 6000 sq. ft. of hard surfaced paving.

Conveying Equipment

A stockpile of from 25,000 to 30,000 tons of graded slag aggregate is maintained in sizes from ⅜ in. down. From the stockpiles the slag is lifted by power shovels to a traveling hopper astride a horizontal, 48-in. conveyor belt, 300 ft. long. This conveyor belt carries the aggregate over a set of magnetic rolls to remove all free iron before it spills on to a 200 ft. long inclined conveyor leading up to the aggregate storage bins.

High early strength portland cement is used exclusively. The cement is delivered in bulk trucks. Cement bins have a capacity of 650 bbl. Cement and aggregates are delivered to the mixers above the block machines through Butler batching and weighing equipment. Steam for the entire plant is provided by two automatic oil-fired steam generators.

Diversified Products

The Mercier company is now making 40 different shapes and sizes of Mercrete block in each of the two weights in addition to Mercrete slag brick and reinforced sills and lintels. These are made in various lengths from 2 to 10 ft. Mercrete block are made as thin as 1 in. and as thick as 12- x 8- x 16-in.

The entire Mercier operation is conducted with 46 employes including manufacturing, office and sales personnel. All slag aggregate is from the plant of the Edward C. Levy Co.

Hydrogen Sulfide's Effects on Pipe

THE AMERICAN CONCRETE PIPE ASSOCIATION recently announced availability to its membership of the technical memorandum, "Hydrogen Sulphide Generation As Related to Sulphites in Water Supply Systems."

Previously, the association had received several inquiries from member companies, concerning the oxidized hydrogen sulfide problem. In order to provide the most authentic information possible, the association directed a series of questions regarding the subject to three well-known sanitary engineers—one on the West Coast, one in Chicago, and one on the East Coast.

Make Floor Slabs by Centrifugal Method

By WALTER B. LENHART

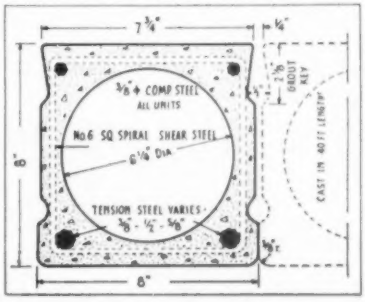
Permacrete Products Corp., Columbus, Ohio casts floor slab by spinning mold. Other products include fence posts, railroad paving slabs, atomic defense concrete and precast building units

THE PERMACRETE PRODUCTS CORP., Columbus, Ohio, started precast concrete operations in the early 20's. The initial production centered around the manufacture of fence posts and slabs for paving railroad grade crossings. Both of these items are still being produced.

One of the recent steps in the development of this company's business was their Permacrete Corflor. This is an 8- x 8-in. cross section unit with a 6¼-in. diameter opening through the center. The members are made by spinning the mold and the concrete centrifugally so that a smooth exterior surface and dense concrete of high strength are obtained. In the spinning all excess water in the mix is removed. Prestressed round deformed tension bars are used for reinforcing, using ⅜-in. to ⅝-in. diameter steel. The units are all cast in 40-ft. 6-in. lengths, and are then sawed to the required lengths for the building. They weigh 53 lb. per sq. ft. and are in use up to 32-ft. clear spans with a 35-lb. per sq. ft. live load.

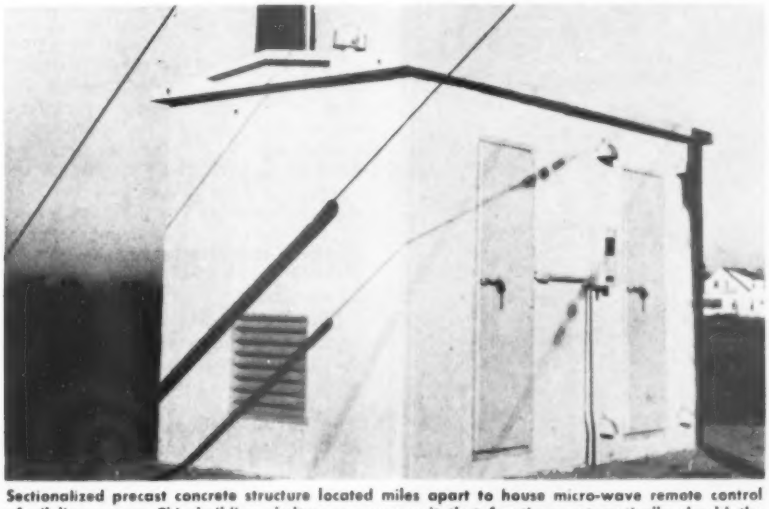
For Oil Line Pump Houses

A few years ago the company developed its sectionalized precast concrete building. When the use of micro-wave electronic control for widely scattered plant units developed so rapidly during the last year or so, the sectionalized structure idea blossomed into full bloom. The micro-wave industrial control system for long range oil or natural gas pumping installations represents a typical use of this precast structural unit. A recently installed pipeline from Missouri to Wyoming has pumping plants along the line. One operator controls all the operations. By directing a micro-wave beam, he can start or stop a pump miles away. A dial system, somewhat similar to the telephone dial, is used. Since micro-wave works on a line-of-sight principle, the stations are necessarily fairly close together, averaging approximately 20 miles apart.



Cross section details of reinforced concrete floor slab which is cast centrifugally in 40-ft. 6-in. lengths

The Permacrete Products Corp. has developed a precast vertical sandwich-type reinforced wall panel for this type of housing. The panels are 4 in. thick with an outer skin of 1¼-in. high strength concrete and a 1½-in. fiber glass core. The panels are sealed together with a strip of closed-cell neoprene. Formerly a plastic caulking was used. The vertical panels are connected together by a small steel plate. The bolts used with these plates have an eccentric nut which, when drawn up, pulls the panels together tightly. The panels are cast flat in 2-ft. widths and in lengths from 7 ft. to 10 ft. No special foundation is needed, and if later the building has to be enlarged, it can be done so by simply bolting on more panels. The buildings are easily assembled, and for the micro-wave work are ideal as they have room enough for the equipment and for the maintenance crew to work in them out of the weather. They are rugged enough to stand up well under adverse weather and for the small boy with his rifle, they are bullet-proof.



Sectionalized precast concrete structure located miles apart to house micro-wave remote control of oil line pumps. This building shelters a power unit that functions automatically should the main source fail

Atomic-Defense Concrete

A still later development of this progressive company is a heavy concrete that weighs 390 lb. per cu. ft. It is intended to be used to ward off atomic radiation. Some technologists hold that the heavier the concrete the better the radiation barrier.

G. Eugene Nagel is vice-president and general manager of the Permacrete Products Corp.

Concrete Conferences

THREE CONFERENCES on "Practical Concrete Problems," sponsored by the University of California Extension Service and other organizations, including the Portland Cement Information Bureau, were recently completed. The first meeting was held April 24, in San Francisco, Calif., and was attended by nearly 300 engineers, architects, inspectors, and men working with concrete. The second meeting was held May 8, in Fresno, Calif., with an attendance of almost 100. The third and last meeting for the year was held May 15, in Sacramento, Calif., with more than 200 in attendance.

The conference sessions consisted of a series of panel discussions. Questions by those attending were submitted to a panel of experts, consisting of Joe Kelly, professor, Civil Engineering Department, who acted as moderator; Edward Howard, engineer, Pacific Coast Aggregates, Inc., San Francisco, Calif.; J. E. Jellick, manager, Portland Cement Information Bureau; and other local representatives of the three cities at which the conferences were held.

Practical concrete questions such as: How to reduce shrinkage cracks in concrete floors; the advantages of air-entraining agents in concrete; the relative merits of membrane curing of concrete as compared to water curing; and many other practical questions were discussed. Those questions which the panel could not answer offhand were referred to Mr. Jellick of the Portland Cement Information Bureau, who gave the answers in writing or by telephone.

Large Prestressed Concrete Bridge Units

Made With Lightweight Aggregates

The Carter-Waters Corp., Kansas City, Mo., holds test demonstration to show strength of prestressed units

By TIP BROWN

CONCRETE PRODUCTS MANUFACTURERS, looking to the expansion of their business, can find an excellent source of study in the methods employed by The Carter-Waters Corp., Kansas City, Mo., in familiarizing the public with advances in the use of concrete in the precast and prestressed fields.

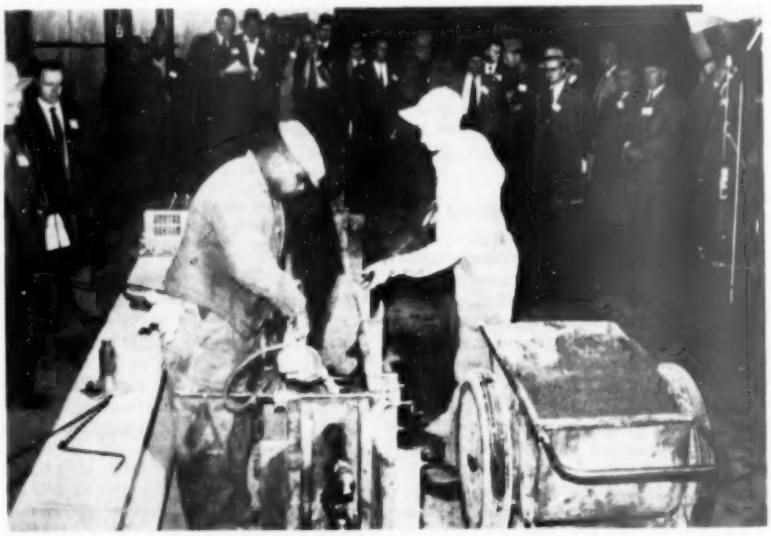
Additional space required for this part of the business has brought about a fifth addition to the three-year old plant which occupies a seven-acre site on the Kansas City Terminal railroad. The new 30- x 70-ft. wing is constructed with a heavy steel frame, concrete joists and roof slabs.

For some time, the company has been engaged in making roof and floor slabs, joists, beams, purlins, guard rail, railroad signal foundations, areaways, stepping stones, splash blocks, lintels, and Haydite building block. Recently, soffit block have been added for floor and roof construction. Machine manufactured blocks are produced on a V3R Besser with a rated capacity of 780 block per hr. of 8- x 8- x 16-in., or equivalent units. The plant operates entirely on aggregate produced at its own Haydite plant at Haydite, Mo., 35 miles north of Kansas City.

Precast Test Demonstration

Recently, the highway departments of the area have become interested in the use of precast and/or prestressed units in the construction of highway bridges. These units are cast at the plant, transported to the job, and set in place by the contractor upon prepared foundations.

Two demonstrations of the mechanics of precast manufacture have been conducted at The Carter-Waters plant for engineers and public officials on a bridge job in Mercer County, Mo., awarded to the Quinn Construction Co., Kansas City, Mo., in April, 1952. Carter-Waters supplied the contractor with 21 slabs which are 34 ft. long, 3 ft. 2 in. wide and 18 in. deep. On six sections, the curb was cast integrally with the slab. The transportation haul to the job was about 125 miles. The use of lightweight aggregate effected a saving of 100,000 lb. on this bridge.



Highway officials and concrete products manufacturers watching the placing and vibration of concrete in the mold

Recording data during progress of the test on concrete bridge member

A prestressing demonstration was held in December, 1952 at the plant in conjunction with Prestressing, Inc., San Antonio, Texas. Representatives of the Southwest Research Institute, of San Antonio, were present and assisted in the testing operations. About 100 people in the engineering, educational, and industrial fields responded to invitations to witness the operations from 10 a.m. to 3 p.m., and to have lunch in the plant as guests of the company. Prominent concrete products manufacturers from several midwestern cities were interested spectators.

The demonstration consisted of two sections. One involved beams designed for use in a roof system composed of soffit blocks and precast girders which will form the roof of a new building The Carter-Waters Corp. will erect at their headquarters location at 2440 Pennway, Kansas City, Mo. One beam was displayed loaded to 40 lb. per sq. ft., the designed live load. In the second, visitors were shown the as-

President A. R. Waters of The Carter-Waters Corp., explaining over the loud speaker system steps in the demonstration test of prestressed, reinforced concrete bridge member

sembly operations, including the stressing of steel by means of a Simplex ram with 6-in. travel.

Concrete pouring operations, accurate wire cutting and heading, and threading the steel prestressing wires in a cured beam, and finally, conducting a breaking test on a finished prestressed Haydite concrete beam were shown the visitors during the day.

An elaborate testing arrangement occupied a portion of the casting floor space and consisted of the precast and post-tensioned concrete I beam, 20 ft. 5 in. long, placed upon a 24-in. W.F. steel beam supported by a Haydite concrete block foundation. Pressure of the hydraulic testing rig was applied to the prestressed beam by means of a short steel beam set upon two steel rollers which rested upon the third point of the prestressed beam.

The test was performed to point the way for the use of prestressing in lightweight concrete, and the beam had previously been given an exhaustive study at various loads to obtain a general indication of the magnitude of the plastic flow and creep in the Haydite concrete. The beam was designed for a third-point loading of 19,500 lb. Following a series of loadings, starting at zero and moving up gradually to 39,000 lb. where a deflection of ¾ in. was observed, along with the first cracks, the load was released and rechecks made. The cracks closed completely. Ultimate failure was reached at 51,000 lb., or 2.65 times the designed load. The tests were followed with intense interest by the audience and comments were of a complimentary and constructive nature. Highly powered spotlights, used by a movie photographer recording the events, enabled the visitors to detect even the minute changes in the beam as the tests progressed.

The occasion marks a landmark in the use of lightweight aggregate in the United States, being the first attempt to develop this data. It further suggests opportunities for expansion of plant manufactured products through well-conceived and well-executed experiments of this kind.

The following has been taken from a report prepared by the company giving some pertinent facts covering this bridge job:

"The specifications under which these slabs are being fabricated were written by the Missouri State Highway Department. The mix was designed for seven sacks per cubic yard for a 28-day strength of 4500 p.s.i. Nine cylinders are taken of each pouring, three from each of three batches. The slabs are left in the mold 48 hr., and the concrete shall test at least 1500 p.s.i. before the slabs are lifted. We have been moving the slabs to storage the second day after casting. The concrete for the first slabs showed a cement ratio slightly in excess of seven bags per yard, and the cylinders tested 3800 p.s.i. average in 48 hr. In the last several slabs, the cement ratio has been reduced to a little under seven bags which is our regular precast mix. The 48-hr. tests have been approximately 3500 p.s.i. The 14-day tests show a strength of 5500 p.s.i. and 28-day tests, approximately 6200 p.s.i. Cement used is type III for high early strength. Aggregate is a Haydite blend of sizes from ⅜-in. down."

Sixtieth Anniversary

CARR BROS., Bedford, Ohio, coal and builders supply firm, recently celebrated its 60th anniversary by the establishment of a new ready-mixed concrete plant near Bedford. The company now operates 11 transit-mixer trucks. Officers of the company are Floyd L. Carr, president; Floyd E. Carr, vice-president; Mrs. Floyd L. Carr, secretary; and Richard G. Carr, treasurer.

Lightweight Aggregate Plant In Production

LIGHTWEIGHT AGGREGATES, INC., is a recently organized company established at Rapid City, S.D., by Dr. Ray E. Lemley, for the production of Haydite lightweight aggregate. A second affiliate plant, operated under the name of Molite, Inc., has been established at Mandan, N.D.

The Rapid City plant expands shale in a natural gas-fired, 8- x 60-ft. rotary kiln. The expanded material is crushed in a small Cedarapids jaw crusher from which it goes to a hammer mill, and sizing is done over a vibrating screen. Shipments are made chiefly to eastern South Dakota, North Dakota, Montana and western Wyoming. Much of the new plant's production goes to the adjacent Dakota Lime & Brick Co.'s block plant. Both plants are along the rails of the Chicago and Northwestern R.R. L. R. Kennedy is president and general manager of Dakota Lime & Brick Co.; Ed Kenefick is sales manager.

New Rapid City, S.D., plant of Lightweight Aggregates, Inc.

12. A producer views the ready-mixed concrete business . . .

QUALITY CONCRETE

By JAMES A. NICHOLSON*

Compact plant with gravity flow of all materials

THE FIRST REQUIREMENT OF GOOD CONCRETE is that it be of uniform strength and consistency. To meet this requirement, the ready-mixed concrete operator must combine his efforts with those of others so that there are effective controls over the quality of the ingredients, (cement, aggregates, etc.), mix design, weighing, processing, delivery, placing and curing.

Each structure must be properly designed and efficiently built. During placing operations, the concrete must have required workability for intended job use. The concrete in place must be of adequate strength, uniformity and durability. Concrete must have sufficient strength to unquestionably perform its function in the structure; it must have durability if it is going to continue to perform that function satisfactorily. It is fundamental that the hardened concrete should be as homogeneous as possible, from the top to the bottom and from inside out. The cement, aggregate and water should be proportioned and mixed in such a manner that concrete of desired strength, durability and cost will have the proper plasticity so that it can be efficiently placed and compacted into a homogeneous mass. The combined efforts of the architect, ready-mixed concrete operator and contractor should produce a concrete structure which meets all reasonable requirements as to strength, serviceable life and appearance.

It takes the following to produce hardened concrete of high, uniform quality:

1. Successive batches of relatively uniform graded aggregate.
2. Presence of the proper amount of quality cement.
3. Mix proportions determined on a realistic water/cement ratio.
4. Adequate mixing cycles, standardized upon and used 100 percent.
5. Concrete must leave hauling unit in such a manner as to be of uniform quality from first part to last part of load.
6. Concrete placed in the structure without loss of uniformity and quality.
7. Concrete properly finished and adequately cured.

Producers' Responsibility

Ready-mixed concrete operators should be willing to accept a moral responsibility for each and every cubic yard of concrete that they process and deliver. It is of major import that producers take immediate and continuing steps to self-regulate their operations in the interest of processing a better quality product. To consistently process uniform quality concrete, producers must have both the "know-how" and the "know-why."

We have so much at stake. We should bear in mind that it is our product which is being specified, designed, placed, sampled, cured and tested. We've got to know our product, see to it that concrete mixes are properly designed, insist upon adequate job handling practices, make sure that the "placed" concrete is intelligently protected, (cured), and require that sound sampling and testing procedures be followed.

We must convince architects and engineers that we can consistently deliver a uniform quality concrete. We must always deliver a quality product. For the future of our industry, it is important that operators stand by their product completely; that on large projects, specifications be met "head on" and that similarly, the small user be furnished a quality product.

For concrete to have required qualities, in its hardened state, others besides ourselves must have the necessary "know-how" and "know-why." The architect must know structure designs and concrete specifications. The ready-mixed concrete operator must know how to select materials, properly proportion, adequately mix and efficiently deliver. The contractor must know how to form, place, finish and cure. The testing engineer must know how to design mixes, properly sample and expertly test concrete. For all of us, the road has been too swift and too easy. No single occupation representative has been outstanding in perfection; all have a better job to do.

As the operator stands to profit most by the continued development of the ready-mixed concrete industry, he should take the lead in practicing, understanding and explaining the fundamentals of quality concrete.

The primary responsibility for educating customers, in the use of concrete, belongs to the ready-mixed concrete producer. It is up to each one of us to increase our knowledge and that of our men; to apply this knowledge in improving the quality of our concrete and to pass pertinent information on to those to whom we sell our concrete. The producer must not only make good concrete; he must accept responsibility for "educating the users of his product."

On this matter of "producer responsibility," I particularly like the concluding sentence of C. E. Wuerpel's paper, given at the 1952 University of Toledo Concrete School, (sponsored by the Ohio Ready Mixed Concrete Association); "I feel supremely confident that if we meet our primary responsibility to study, remember, apply and pass on to others, basic fundamentals, then the age of concrete in the construction industry is only beginning."

For construction work, covered both by tight specifications and close inspection, the average producer generally furnishes concrete of a quality sufficient to meet job requirements. On work not so covered, both customers and workmen generally want producers to deliver a cheaper, more workable, inferior quality concrete.

*Pres., Nicholson Concrete Co., Toledo, Ohio

Unfortunately, there has been widespread compliance with such customer demands. Some cement is taken out; water and sand are added. The topsize of coarse aggregate is reduced; the amount cut down. In many markets on this type of work, the end product, ready-mixed concrete, is simply not suitable for intended job use.

This production of inferior quality concrete, by ready-mixed concrete operators, was given nationwide attention at a recent A.C.I. meeting with the delivery of Prof. A. W. Brust's paper, "Why Small Jobs Frequently Get Poor Concrete." Many engineers, who are familiar with Brust's statements, are openly scornful of the sincerity of ready-mixed concrete operators in the latter's efforts to correct these widespread abuses. These engineers express the conviction that the ready-mixed concrete industry must turn loose its best brains to find quickly an effectual answer to this indefensible practice.

There are a number of ways in which customer demands for an inferior product can be handled:

(a) Concrete for non-specification work designed on a maximum water-cement ratio basis. If concrete of higher slump is required, extra cement is added at increased price, to keep the quality of the concrete within safe limits, (e.g., sell 3,000-lb. concrete, 2 to 4-in. slump at $11.50 per cu. yd.; 5 to 7-in. slump concrete of the same strength at $11.85 per cu. yd.). This is good operating practice.

(b) Meet demand for added workability by using a smaller topsize aggregate, (using ¾ in. gravel instead of 1½ in .topsize), using air entrainment or going to a higher air content.

(c) Deliver concrete that is within safe limits and require the contractor to sign an authorization for the addition of water. Such authorization should be so worded as to relieve the ready mixed concrete producer of responsibility for the quality of his product.

(d) Give the contractor anything which he or his men want—"the devil take the hindmost."

Producers, almost without exception, will never admit that procedure (d) is their standard practice. Actually, at too many operations, such compliance with demands is a regular occurrence. This matter of "quality," is just about the industry's No. 1 problem. The aim should always be to furnish prescription concrete, the kind of quality the customer ought to have; not the "mill-run" concrete, the kind too many customers think they want. To furnish, at any time, concrete that does not meet minimum requirements for intended use is to actively court disaster. An operator's position is fundamentally sound only when he processes concrete which adheres closely to the proper water/cement ratio.

Unless producers, generally, self-regulate their operations as to insure the processing of quality concrete, the ready-mixed concrete industry is in for some rough weather. On an aggressive, ever-continuing basis, we must promote the specifying, processing and placing of quality concrete.

People and Events

In retrospect, the fabulous, almost fantastic growth of the ready-mixed concrete industry can be seen as a result of the action and thinking of a small group of men, together with the happening of several important events and the unbelievable expansion that occurred during the last 25 years.

The ready-mixed concrete industry owes much to Duff Abrams who, approximately 30 years ago, both clearly stated the water/cement ratio and developed the measurement of fineness modulus. His work, and that of other great scientists such as, Rene Feret, R. B. Young, A. N. Talbot, R. W. Crum, Franklin R. McMillan, C. A. G. Weymouth and H. F. Gonnerman, formed the background for the works and accomplishments of such men as Stanton Walker, A. J. Goldbeck, J. E. Gray, Fred Hubbard, C. E. Wuerpel, R. F. Blanks, Frank H. Jackson, Henry L. Kennedy and many others.

To A. T. Goldbeck and J. E. Gray who, through their intensive studies in the laboratories of the National Crushed Stone Association, developed sound, modern, practical theories and techniques in the field of concrete proportioning, our industry is deeply indebted.

To their colleagues in fellow organizations, Stanton Walker, engineering director of the National Sand and Gravel Association, and Fred Hubbard, engineering director of the National Slag Association, for their own great contributions to proportioning procedures, a similar debt of gratitude is owed.

To the many concrete scientists, who have served on A.S.T.M. and A.C.I. commmittees and who have labored selflessly and unstintingly, to these men too we should be grateful for the contributions their work has made to the growth and development of our industry.

A number of events and developments similarly have been of outstanding importance in the success story of ready-mixed concrete.

Included in these important steps are the invention of portland cement by the Englishman, Joseph Aspdin, the development of reinforced concrete, promulgation of the water/cement ratio, the invention of the truck mixer, the use of internal vibration and the development of air entrainment.

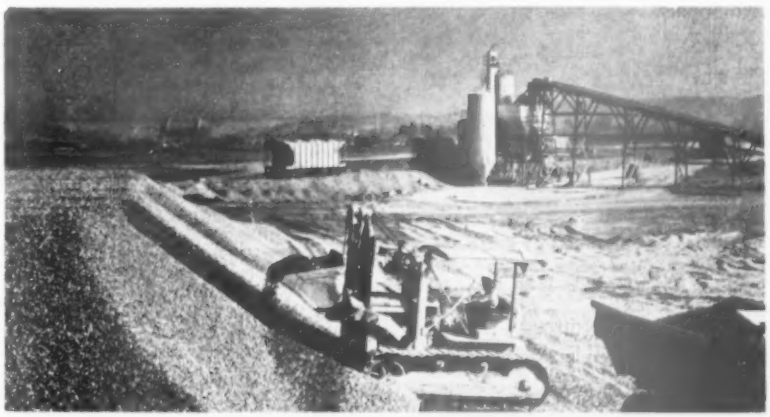
Events of equal magnitude, which occurred outside the ready-mixed concrete industry, have contributed to its unusual growth. These events include: The development of the automobile and the need for rugged, hard-surfaced highways; the building of heavy duty trucks and the tremendous growth of the trucking industry; the effects of two wars and the accelerated rate of expansion that has carried practically all lines of business to new all-time records.

Less dramatic, but of important assistance to the development of ready mixed concrete, has been the effective work of such organizations as the American Society for Testing Materials, the American Concrete Institute, the Concrete Reinforcing Steel Institute, the Portland Cement Association and the National Ready Mixed Concrete Association.

Ready Mix Specifications

An article which appeared some time ago in the San Francisco Chronicle contained this statement: "Good concrete is as easy to make as a bride's biscuits." The person who made that statement must have been thinking about ready-mixed concrete. It is a tough enough problem to consistently produce quality concrete on a big project where everything is under close control. As thinking members of our industry realize, it is a much more difficult task to control the quality of concrete which is being placed on different jobs, miles away from the mixing or batching plant.

Yet it is probably true that a number of ready-mixed concrete operators have never even read, much less



Large ready-mixed concrete plant set up to serve big dam project

studied, A.S.T.M. specifications on ready-mixed concrete, (issued in pamphlet form by the National Ready Mixed Concrete Association).

To comply with the A.S.T.M. specifications, or with any good specifications, a ready-mixed concrete operator must be able to deliver load after load of consistent quality concrete. The aggregates and cement which are used must comply with A.S.T.M. provisions, minimum strength requirements must be met, and all the concrete must be held within specified limits on slump, air content, etc. Assuring consistent quality concrete, suitable for intended job use, is at least the intention of any specification.

From the basic A.S.T.M. specification on ready-mixed concrete come many hundreds of specifications as changes and additions are made because of differences in aggregates available in local markets. However most changes and additions come about as a result of sales efforts made on behalf of equipment, admixtures and other special products.

In many markets, requirements appear in specifications which simply should not be there. Sometimes an item will be inserted for a particular purpose. In certain offices, an item once in a specification may stay for a long time. Many concrete specification anachronisms are still with us simply because it is easier to copy than it is to think. However, I am convinced that most of the blame for both the inclusion of objectionable requirements and our general relations with architects belongs to the ready-mixed concrete producer. There is something wrong when an architect specifies an unproven product without even consulting the man who will be responsible for processing the concrete.

Each ready-mixed concrete operator should realize that he owes an obligation to an architect to keep him informed on anything new and better in concrete. When a concrete producer is alert to his responsibilities, the architect, having learned to respect the operator's judgement, will call the ready-mixed concrete man first, before putting contemplated changes into the specification.

The present standard specifications for ready-mixed concrete were adopted by A.S.T.M. in 1948. In general, ready-mixed concrete is defined, the unit of purchase is set forth and the determining of quality is provided for by a series of tests. As to quality of materials, the A.S.T.M. specification refers to other A.S.T.M. specifications on aggregate and cement. Regulations covering the use of water and admixtures are briefly discussed. Two bases are set up for specifying the quality of concrete. In alternate No. 1, cement "sax" content, size and weights of aggregates, maximum allowable water content and limits on slump and air content are listed with the ready-mixed concrete producer furnishing records of compliance to the purchaser. In the second alternate, concrete is purchased on a minimum strength basis plus provisions for aggregates, slump and air content. The specification issues a consistency standard requiring a tolerance of ± ½ in. in concrete of 3 in. or less slump and permitting a leniency of ± 1 in. in concrete of a higher slump.

The specifications list minimum standards for weighing and measuring devices, plant controls and mixing units, (both central and transit). On the transit mixer, provision is made for standards on slump, condition of unit and mixing time.

As to slump, samples are required from the first and third quarters of the load with the consistency limits held to a range of 2 in. On mixing requirements, a minimum of 50 revolutions are specified.

In the A.S.T.M. specification, provision is made for central mixing with delivery in an agitating unit, or when purchaser permits, in approved non-agitating equipment; for pre-shrinking and for transit mixing.

On stationary mixers, the specified mixing times are 1 min. for a cubic yard mixer, 1¼ min. for a 2-cu. yd. unit, 1½ min. for 3 cu. yd., 1¾ min. for a 4-cu. yd. machine and 2¼ min. for the big 6-cu. yd. unit. Provision is made that some water must enter the mixer ahead of the aggregates and cement and that all the water must be in the mixer before the first quarter of the prescribed mixing time has expired.*

On agitated hauls, a maximum delivery time of 1½ hr. is permitted with provision for time extension upon approval by the purchaser. In transit mixing, it is specified that actual mixing must begin within 30 min. of the time aggregates and cement are intermingled.

Provision for winter delivery of concrete is touched upon in that it is specified that the temperature of concrete, delivered in a temperature of 40 deg. or less, shall not be lower than 60 deg. nor higher than 90 deg.

In Section 10, a new, rather incomplete, specification for non-agitating delivery equipment has been added. Slump provisions parallel those for transit mixers; hauling time is limited to 45 min. and the use of such equipment must be acceptable to the purchaser.

Except possibly for cases involving the use of air-entrained concrete, adequate provisions are made for inspecting, sampling and testing.

It is specified that either test cylinders shall be made by an independent laboratory and that the average shall meet the minimum allowable strength or the ready-mixed concrete operator may guarantee the concrete to have the specified strengths.

*If strictly enforced, the provision, that all the water must be in the mixer before the completion of one quarter of the mixing time, would defeat efforts to closely control slump limits.

In section No. 17, provision is made for steps to be taken when the delivered concrete fails to meet minimum strength requirements. The final section, No. 18, lists the different tests to which the concrete is to be subjected and refers the testing laboratory to the proper A.S.T.M. testing procedures.

In a good specification, provision is made for a satisfactory quality of materials, compliable strength requirements, reasonable gradation limits including top-size, proper percentages of fine and coarse aggregate, a safe water/cement ratio, accurate yield, required air content, sensible slump range and adequate weighing-mixing controls. With the main concern being the attainment of satisfactory quality, the prescription of method is generally avoided. On most occasions, determination of procedures to follow in reaching specified results is left to the discretion of the concrete producer.

A good specification is always practical; it can never be unreasonable. In a practical specification, market conditions are faced, reasonable gradation limits are permitted, a sensible slump range is allowed and provision for sand percentage is such as to give needed workability. In an unreasonable specification, amount of water, percentage of sand, air contents and slump are held to unnecessarily low limits; excessive cement is specified, weighing-mixing operations are held within exceedingly close tolerances, (e.g. ¼ percent on aggregate weighing), and strength requirements are placed abnormally high.

A practical specification, calling for the use of a ¾-in. topsize aggregate, requires compressive strength results in the 2000-lb. to 3500-lb. range; with 1½-in. aggregate in the 2500-lb. to 4000-lb. range. Using 1-in. down material, a specification is certainly unreasonable when it calls for 5000-lb. concrete. Similarly, it is impractical to specify both a low percentage of sand and a high air content. I know of one such specification calling for 32 percent sand, in which the use of 2½ ounces of an air-entraining agent per sack of cement was permitted in a vain attempt to get 4½ percent air. Realities are not being faced when a specification requires both a reduced amount of sand and an increased air content.

Efficient specification writers take into consideration local market conditions, service records of available materials, reputation of ready-mixed concrete producers, concrete handling practices of contractors, performance of testing laboratories and variables of processing and testing.

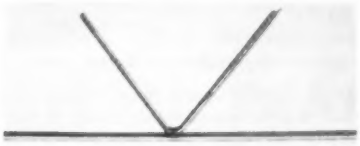
Specification writers should ask themselves such questions as: How far to go in enforcing close grading limits? Can strength requirements be easily met with the specified water/cement ratio? How can both quality and economy be assured? Can mixes

(Continued on page 170)

NEW MACHINERY

Masonry Reinforcing

CEDAR RAPIDS BLOCK CO., Dur-O-waL Div., Cedar Rapids, Iowa, recently made available its butt-weld steel reinforcing member. The truss-



Steel reinforcing member in butt-weld design

ed-type butt-weld is electrically welded on a single plane for tight mortar joints and is available in both standard and extra-heavy weights. The standard weight model is welded from No. 9 side rods and No. 9 cross rods, while the extra-heavy weight combines $\frac{3}{16}$-in. side rods with No. 9 cross rods. Both weights are available in sizes for standard wall thicknesses from 4 to 13 in.

Masonry Coating

THE DASCO CHEMICAL CO., INC., 1602-04 Thames St., Baltimore 31, Md., has announced its silicone and plastic emulsion, waterproof coating, ready for the market. For use on masonry surfaces, it is said to penetrate and seal against water penetration. The product, Dascone, contains no solvents and thus may be applied while walls are still damp. This feature also eliminates the high flash point which creates a fire hazard during application.

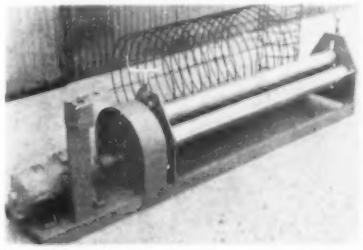
Concrete Block Cubers

THE GENE OLSEN CORP., 401 Grace St., Adrian, Mich., has developed two types of pneumatically-operated block cubers: the crane type with single or dual cubing clamp assemblies, and the boom type with single clamp assembly. Blocks used for the base of the cube are positioned to suit the type of forks employed on the fork-lift truck. Succeeding layers may then be placed with the cuber.

Crane-type block cuber

Reinforcing Wire Roll

HOUSTON CONCRETE MACHINERY CO., 114 Heights Blvd., Houston, Texas, has designed specially for producers



Wire cage roll forms cages to any radius

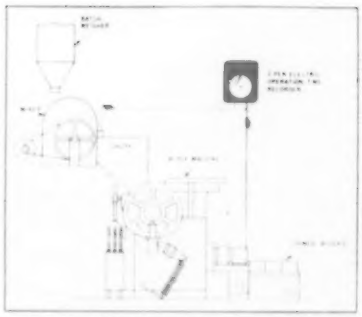
of concrete pipe, a lightweight roll which forms reinforcing wire to any desired radius. Featuring three gear-driven rolls to prevent a tendency toward slippage when large cages are being formed, the roll handles wire of any gage and up to 60-in. width.

Front End Loaders

MIXERMOBILE MANUFACTURERS, INC., 8027 N.E. Killingsworth St., Portland, Ore., has developed the Scoopmobile front end loaders, models LD5 and LD10, which have 4-wheel planetary drive and 4-wheel power steering. These models employ two power axle elements hinged together with an oscillating center-pin steering coupling to allow an oscillating twist to the axles, while retaining full power on all 4 wheels in any degree of the turning radius. Traction and "dig in" power is transmitted to the wheels through 3 to 1 planetary gearing. Features of the Scoopmobile include an hydraulically operated loading bucket; pneumatic tires; weather-tight operator cab with safety glass and windshield wipers; and reversing transmission of 8 speeds forward and back. Diesel power is optional. The capacities of models LD5 and LD10 are $\frac{3}{4}$ to 1 cu. yd. and $1\frac{5}{8}$ to 2 cu. yd., respectively.

Operation Time Recorder

THE FOXBORO CO., Foxboro, Mass., has introduced a two-pen operation, time recorder for a complete and continuous chart record of batches mixed and block produced. The instrument may be equipped with up to eight pens for use where several automatic machines are in operation. An eight-



Typical application of block machine and batch-mixer time recorder

digit counter can also be furnished to keep a running total of individual machine production.

Concrete Waterproofing

SHIELD CHEMICAL CORP., 251 Grove Ave., Verona, N. J., recently began full-scale production of Drycrete, a concrete additive for integral waterproofing. It is a non-water-soluble liquid which is claimed to provide positive bonding to block or brick, without the need for lath or furring on inside walls, and to reduce shrinkage and cracking.

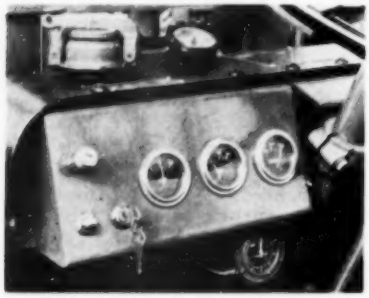
Masonry Saw Blade

CLIPPER MANUFACTURING CO., 2800 Warwick, Kansas City 8, Mo., has brought out a line of high-speed, abrasive, wet-cutting blades for its masonry saw in cutting vitreous brick, tile, stone, concrete, etc. Protective blade blotters lessen the possibility of fracturing from over-tightening the blade collar, and steel blade centers guard the saw shaft and strengthen the blade. The wet-cutting blades provide dustless sawing and, due to their break-resistant quality, the blades are said to withstand twisting and bending. Tests conducted by the company showed that the blade cuts through 2- x 5-in. furring tile in 11 seconds; first quality, dry press fire brick in 5 seconds; face brick in 8 seconds; and concrete block in 17 seconds.

Masonry saw with high-speed blade

Engine Hour Meter

TOWMOTOR CORP., 1226 E. 152nd St., Cleveland 10, Ohio, has made available the Hobbs engine-hour meter, as original equipment at additional cost,



Meter records engine operating hours

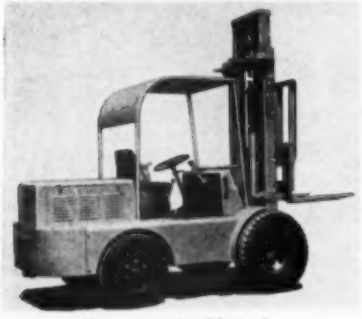
or installed on its units already in use. The instrument permits accurate recording of all phases of lift truck and tractor operations. It aids in scheduling maintenance and periodical service check-ups, and provides a reliable basis for computing costs on specific handling jobs, as it operates only while the ignition switch is turned on. After recording 10,000 hours of engine operation, the instrument automatically restarts at zero.

Masonry Waterproofing

THE MONROE CO., INC., Cleveland, Ohio, has announced "Damp-Seal," an oil-based paint containing a grit-like volcanic ash filler, for waterproofing masonry surfaces. It is ready-mixed and can be applied by brush or spray over unpainted or previously painted surfaces, wet or dry. The paint is said to resist lime, alkali, salt, mold and fungus and, to seal without peeling, chipping, blistering or cracking. It is available in seven colors and may be applied to cinder block, concrete block, brick, stone, stucco, tile and asbestos.

Lift Trucks

CHAMP CORP., 1703 S. Mountain Ave., Duarte, Calif., has brought out two lift-truck models, "500" and "700." Power steering, power brakes, 100-hp. International engine, 12-in. clutch and 8- to 16-ft. lift masts are

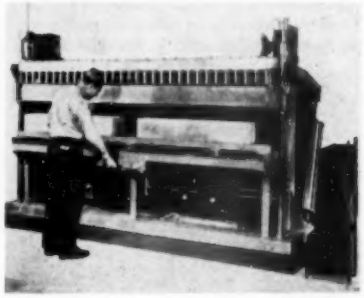


Power steering lift truck

standard truck equipment. Overhead valves and replaceable cylinder sleeves are additional features of the 5000-lb. capacity lift trucks. Either single or dual drive wheels are available with a 70-in. wheelbase and a 13-ft. turning radius.

Pre-Cast Concrete Machine

PRECASTER INC., 5215 Beech St., Cincinnati 17, Ohio, announced the PreCaster, a machine which produces electrically-vibrated units such as lintels, highway guard rail posts, joists,



Machine produces pre-cast concrete units

channel roofs and floor slabs. The units strip through a 4- x 8-in. or 8- x 8-in. box up to 10 ft. long. The mold box may be replaced by another box to fit any width pallet. The machine is said to provide the same density and texture and the same method of rack-curing as regular concrete block.

Masonry Surface Coating

UNION CARBIDE AND CARBON CORP., Bakelite Co., Div., 260 Madison Ave., New York 16, N.Y., has announced Styrox, a moisture-resistant, decorative coating for masonry surfaces, above or below ground, inside residential, commercial or industrial buildings. The coating, based on Bakelite polystyrene latex, is said to be quick drying, durable, and resistant to soap, alkali, acid and chemical fumes, as well as to dirt and abrasion. Plaster, brick, cinder-block and painted metal surfaces that are free of corrosion and scale, can be covered by Styrox. It is also claimed that the coating will not lift, peel, chip or crack if the surfaces have been properly cleaned of scaling paint, oil, grease and dust. The finish tends to reduce spalling of concrete, as it seals the fissures. The coating may also be applied to cellar walls, where seepage is caused by intermittent drainage. Various colors are available in one- and 5-gal pails.

Truck-Mounted Crane

PITMAN MANUFACTURING CO., 300 W. 79th St., Terrace, Kansas City 14, Mo., has added a hydraulically-operated outrigger, as optional equipment, to Model B "Hydra-Lift," a truck-mounted crane with a loadline capa-

Outrigger leg levels truck-mounted crane

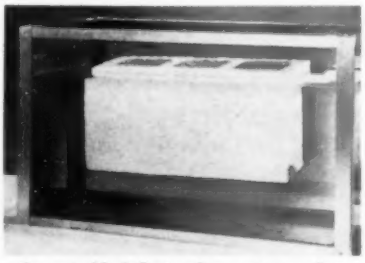
city of 6400 lb. and a power-swinging boom which telescopes from 12 to 22 ft. The outrigger legs may be raised and lowered by manipulating controls at the regular operating station. If the truck on which the lift is mounted is on uneven ground, the outrigger may be used to level it before picking up a load.

Steering Axle Assembly

UNITED MANUFACTURING CO., 43 W. Interstate St., Bedford, Ohio, recently announced the addition of a 1¾-in. square-beam, front, automotive steering unit to the Caravan axle line. The assembly is a lightweight unit with a capacity of 2000 to 4000 lb., featuring ground king and center pins to provide better fit and maximum roadability. The four-wheel assembly also incorporates screw-in type grease fittings, controlled camber, tow-in and caster, to facilitate positive trailing action at high speeds. The unit is designed for such applications as transporting generators, air compressors, concrete mixers, and vertical drilling equipment.

Masonry Resurfacing

THE REARDON CO., 7501 Page Blvd., St. Louis, Mo., has developed a waterproofing formula for resurfacing porous masonry surfaces. It is used in the manufacture of Bondex Cement Paint, for dampness control problems, and Bondex Heavy Duty, for serious moisture control difficulties. Applied with a fiber brush, the heavy duty product gives a thick white coating to interior and exterior masonry walls, and penetrates the pores to become a part of the wall. It is used for resurfacing concrete, cinder block, rough brick, and rough poured concrete.



Concrete block floats after water-proofing

Survey of small and medium size ready mixed concrete plants shows cost data on seven typical operations. Article in this issue deals with permanent plants; second article will describe portable and temporary units

Fig. 1: A simply-designed, back-country ready mixed concrete plant, producing concrete for everything from chicken coop foundations to industrial structures

SMALL READY-MIX CONCRETE PLANTS

By HORACE K. CHURCH*

THIS ARTICLE deals with small and medium size ready-mixed concrete plants producing up to 200 cu. yd. of concrete daily. Such plants are generally of the ground-level type as distinguished from the overhead bunker type; they are set up generally at no great initial cost; and they represent usually much ingenuity in setup, this resourcefulness being the result of wanting to make ready-mixed concrete with little initial capital.

Such plants dot the United States and they run the gamut of simple volume batching setups to refined, closely-controlled central plants. They are used by permanently located ready-mixed concrete companies and by transient general contractors. They are set up in isolated sections where they serve a definite trade area, sometimes without competition. A typical little plant might serve a town of 6000 population with a surrounding trade area population of 3000, or a total of 9000 people. Again, such a plant might be located right in the midst of a metropolitan area, surrounded by well-established plants producing thousands of yards of concrete daily. General contractors and sub-contractors use these plants for pours not involving mass concrete. Examples are highway structures, oil-field mats, waterway pipes and canals, and dam appurtenance foundations.

These plants have increased greatly in numbers during the past few years due chiefly to the increased demand for ready-mixed concrete. In many cases they are not members of, nor are they recorded and listed by, the ready-mixed concrete associations. Let us say that they are emphatically a tribute to the desire of the little man to go into business for himself.

This article describes seven examples of permanently located ready-mixed concrete plants and a second article devoted to seven examples of temporarily located construction type ready mixed plants. It will be observed that several of the "permanently" located plants are in reality semi-portable, designed by the rugged individualist so that he can move readily to more green pastures.

The simplest plant uses volume batching with all the attendant well-known shortcomings, particularly from the viewpoint of the engineers with their ever-present slide rules and black books. Sand and coarse aggregate are proportioned by volume, sometimes with a certain amount of guess work, the amount of cement is added for a given mix ratio, water is added for the right workability, and there generally results good concrete. Sometimes, on the basis of cylinder tests, the results add much to the consternation of the legitimate proponents of "fineness modulus," "water-cement ratio," "air entrainment," and the like.

Fig. 1 is such a plant, set up in a back country location and producing concrete for everything from chicken coop footings to industrial building structures. Even though characterized by extreme simplicity this is a permanently located plant. Materials are taken from an adjacent river wash pit and then elevated, screened, and discharged into overhead hoppers. Mixers are then loaded with closely estimated quantities of fine and coarse aggregates, a combined weight check is made over platform scales, water is metered into the mixture, and then sack cement is added at the cement shed.

In analyzing production and unit costs of these 14 plants, a uniform system is followed so that comparisons within reasonableness can be made. Generally two to four 3-cu. yd. transit truck mixers are being used. The following uniform assumptions are made for all of the 14 examples.

1. Offices, bins, sheds, and timber structures are depreciated over 10 years and other related nearly fixed items, such as repairs and interest charges, are estimated at an additional total of 10 percent of cost annually, the total charges being therefore 20 percent of cost on an annual basis of 2000 working hours each year.

2. The hourly expense of owning and operating, except labor, stationary plant machinery; such as, bins, conveyors, and water systems, is at the rate of 3¢ for each $100 of cost of new machinery.

3. Correspondingly, the hourly expense of owning and operating, excepting labor, mobile plant machinery, such as skip loaders, weigh batch loaders, and transit truck mixers, is at the rate of 4¢ for each $100 of cost of new machinery. The factors of 3¢ and 4¢ closely approximate actual experience.

4. Labor, including insurance and social security, is fixed at the hourly rates of $2.20 for plant operators, $1.65 for dispatchers or office men, $1.93 for plant helpers, and $1.93 for truck mixer drivers.

5. Productions, hourly and daily, are based on the writer's time studies of complete batching cycles for 3-cu. yd. truck mixer loads, including the loading of the mixer.

6. Overall plant efficiency is placed at an average 67 percent of plant capacity so as to approximate daily results. This is equivalent to working 40 min. of each available hour of the year, 2000 hours available annually.

Accordingly then, the volume batching plant would set up as follows in respect to production and unit cost:

Example 1

Production

1. Batching cycle for 3 cu. yd. of concrete	15 Min.
2. 3-cu. yd. loads per 40 min. hour	2.7 Lds.
3. Cubic yards of concrete hourly	8.1 Cu. yd.

Hourly Cost of Ownership and Operation and Labor

	Own. & Opr.	Labor
1. Office, bins, sheds, etc. at $400 annually	$0.20	
at $2000 cost, estimated		
Dispatcher—office man		$1.65
2. Overhead hoppers, conveyors and water system at $5000	1.50	
Plant man		2.20
3. Three 3-cu. yd. truck mixers at $19,500	7.80	
Drivers		5.79
Totals	9.50	9.64
Grand Total		$19.14
Approximate plant and truck mixer investment		$26,500
Total crew		5
Estimated daily average production, cu. yd.		65
Unit cost, based on all fixed and operating expenses, 65 cu. yd. daily		$2.37

*Civil Engineer, Willard Concrete Machinery Sales Co., Lynwood, Calif.

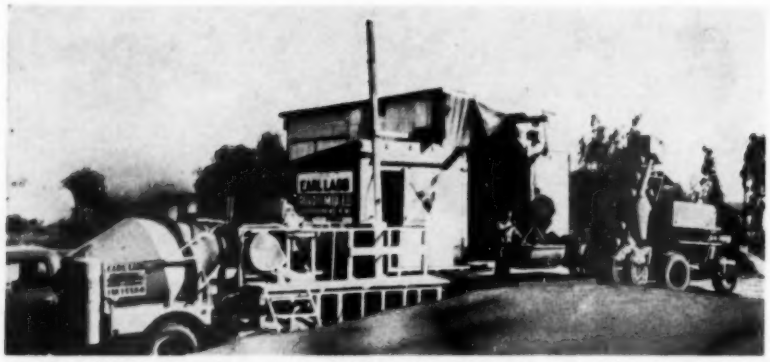


Fig. 2: Small central mix plant uses a weigh batcher loader that loads and weighs aggregates from stockpiles

Leaving the elementary volume batching plant, weigh-batching plants of varying degrees of mix precision and plant efficiency are found.

The second example of a small central mix plant, Fig. 2, involves the use of the weigh batch loader, a device which loads and weighs aggregates from stockpiles, as well as cement if desired, and then transports the proportioned mix to either a receiving surge hopper or direct to the foot of a mixer loading conveyor.

In this instance a receiving surge hopper is used, located immediately beneath the clamshell bucket in the accompanying illustration. Below the hopper is the conveyor for loading the mixer. Bulk cement is handled by a weigh-scale-equipped clamshell bucket, two passes being required for cement for 3 cu. yd. of concrete. The batching cycle requires about 12 min., due chiefly to the delay in handling bulk cement. Part of a stockpile of sand is visible to the right and the loading mixer is seen to the left. The plant, set up in a highly competitive area, serves a town of about 13,000 people.

Example 2

Production

1. Batching cycle for 3 cu. yd. of concrete	12	Min.
2. 3-cu. yd. loads per 40 min. hour	3.3	Lds.
3. Cubic yards of concrete hourly	9.9	Cu. yd.

Hourly Cost of Ownership and Operation and Labor

	Own. & Opr.	Labor
1. Office, bins, and sheds at $3000 cost, estimated at $600 annually	$0.30	
2. Weigh batch loader at $8000	3.20	
3. Bucket, hopper, conveyor, and water system at $3000	.90	
Combination dispatcher—plant man		$2.20
4. Three 3-cu. yd. truck mixers at $19,500	7.80	
Drivers		5.79
Totals	12.20	7.99
Grand total		$20.19
Approximate plant and truck mixer investment		$25,500
Total crew		4
Estimated average daily production, cu. yd.		79
Unit cost, based on all fixed and operating expenses, 79 cu. yd. daily		$2.04

The production of this plant could be increased by about 25 percent with the use of a larger cement bucket of about 15-sack capacity, and plans have been made therefor.

Fig. 3 shows a comparatively small capacity ready-mixed concrete plant that combines overhead hoppers, rail-mounted travelling weigh batcher, and mixer loading conveyor. Sacked cement, which is dumped directly into the small receiving hopper over the conveyor, is handled by the combination dispatcher—plant man, and the truck mixer drivers help batch out their mixers, not an uncommon practice in small-plant operation. Two passes of the batcher are required for 3 cu. yd. of concrete, and the batching cycle requires about 15 min. Three 3-cu. yd. truck mixers serve a town and surrounding area of about 6000 people. The accompanying illustration shows a driver adding water to the mixer load while the combination dispatcher-plant man is wheeling sacked cement into the dumping position.

Example 3

Production

1. Batching cycle for 3 cubic yards of concrete	15	Min.
2. 3-cu. yd. loads per 40 min. hour	2.7	Lds.
3. Cubic yards of concrete hourly	8.1	Cu. yd.

Hourly Cost of Ownership and Operation and Labor

	Own. & Opr.	Labor
1. Office, bulkheads, sheds, etc. at $3000 cost, estimated at $600 annually	$0.30	
2. Overhead hoppers, bucket elevator, batcher, conveyor, and water system at $7500	2.25	
Dispatcher—plant man		$2.20
3. Three 3-cu. yd. truck mixers at $19,500	7.80	
Drivers		5.79
Totals	10.35	7.99
Grand total		$17.34
Approximate plant and truck mixer investment		$32,000
Total crew		4
Estimated average daily production, cu. yd.		65
Unit cost, based on all fixed and operating expenses, 65 cu. yd. daily		$2.14

This plant represents just about the simplest form of overhead plant wherein materials must be elevated into overhead bunkers and sacked cement is used.

A desire for shelter and cement dust-free neatness prompted the erection of this covered plant in a seashore resort town as depicted in Fig. 4. Machinery and buildings include weigh-batch loader, conveyor, bulk cement weigh hopper over conveyor, rubber tire skip loader for handling bulk cement, cement shed, plant shed, office, and four 3-cu. yd. truck mixers.

In this locality city zoning laws made it impossible to use an overhead plant and the owner found, interestingly enough, that the imposed ground storage of aggregates carried with it the added advantage of economical storage of multiple aggregates for special purpose concrete. The plant serves a town of 6000 with possibly another 6000 people in the trade area.

Example 4

Production

1. Batching cycle for 3 cu. yd. of concrete	8	Min.
2. 3-cu. yd. loads per 40 min. hour	5.0	Lds.
3. Cubic yards of concrete hourly	15.0	Cu. yd.

Hourly Cost of Ownership and Operation and Labor

	Own. & Opr.	Labor
1. Office, plant and cement sheds, and bulkheads at $5000 cost, estimated at $1000 annually	$0.50	
Dispatcher—office man		$1.65
2. Cement weigh hopper, conveyor, and water system at $3500	1.05	
3. Weigh batch loader and skip loader at $16,500	4.20	
Plant man		2.20
4. Four 3-cu. yd. truck mixers at $26,000	10.40	
Drivers		7.72
Totals	16.15	11.57
Grand total		$27.72
Approximate plant and truck mixer investment		$45,000
Total crew		6
Estimated average daily production, cu. yd.		120
Unit cost, based on all fixed and operating expenses, 120 cu. yd. daily		$1.85

Fig. 5 exemplifies the always desir-

Fig. 3: Ready mixed concrete plant with small capacity overhead hoppers, rail-mounted traveling weigh batcher and mixer loading conveyor

able side-hill construction which permits gravity-handling of materials, augmented by bulk cement, rail-mounted weigh batcher, and conveyor loading of mixers. Total capacity of three aggregate bins is 60 tons and cement silo capacity is 220 bbl. The plant serves four 3-cu. yd. mixers, and the trade area includes two towns of about 6000 and surrounding area of about 3000 people.

Example 5

Production		
1. Batching cycle for 3 cu. yd. of concrete		10 Min.
2. 3-cu. yd. loads per 40 min. hour		4.0 Lds.
3. Cubic yards of concrete hourly		12.0 Cu. yd.
Hourly Cost of Ownership and Operation and Labor		
	Own. & Opr.	Labor
1. Office, sheds, bulkheads, etc. at $5000 cost, estimated at $1000 annually	$0.50	
Dispatcher—office man		$1.65
2. Overhead hoppers, silo, batcher, conveyor, and water system at $7500	2.25	
Plant man		2.20
3. Four 3-cu. yd. truck mixers at $26,000	10.40	
Drivers		7.72
Totals	13.15	11.57
Grand total		$24.72
Approximate plant and truck mixer investment		$34,000
Total crew		6
Estimated average daily production, cu. yd.		96
Unit cost, based on all fixed and operating expenses, 96 cu. yd. daily		$2.06

Illustrations, Fig. 6, show both exterior and interior views of this all-weather plant in a small mountain town at about 5000-ft. elevation. Population is about 4000 and the surrounding trade area adds possibly another 2000 people. Although the truck mixers are of the wet batching type, all water except that for tempering being added at the plant, concrete is hauled as far as 50 miles away. Plant and transportation machinery includes electric weigh batch loader, electric power being preferred in a stationary setup, mixer loading conveyor, water system, and two 3-cu. yd. truck mixers.

Sacked cement is used, and the operator has set up an ingenious method for handling and slitting cement sacks in minimum time, as illustrated in the interior view. Sacks are skidded forward on a rack or slide and an underslung knife cuts the belly of the sack. The company is part of a construction concern, and the total ready-mixed concrete crew varies from two to four, depending upon business.

Production figures must be interpreted in terms of the capacity of the truck mixers on the longer than average hauls rather than in terms of plant capacity.

Fig. 5: Side-hill construction for gravity handling of materials, use of bulk cement, rail-mounted weigh batcher and conveyor-loading of mixers

Fig. 4: Plant built at ground level to comply with city zoning laws

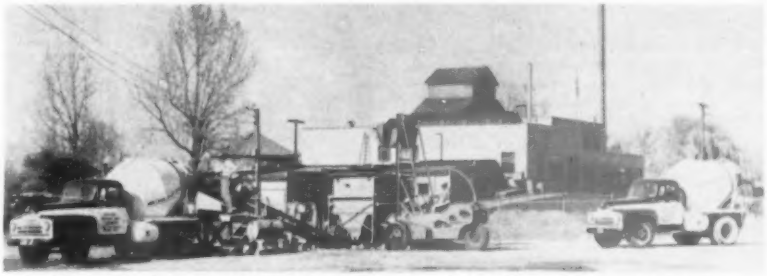


Fig. 7: This plant has front-end loader and 5-cu. yd., three-beam scale weigh batcher

Example 6

Production		
1. Batching cycle for 3 cu. yd. of concrete		8 Min.
2. 3-cu. yd. loads per 40 min. hour		5.0 Lds.
3. Cubic yards of concrete hourly, based on average plant capacity		15 Cu. yd.
4. Cubic yards of concrete hourly based on average capacity of two 3-cu. yd. truck mixers		6 Cu. yd.
Hourly Cost of Ownership and Operation and Labor		
	Own. & Opr.	Labor
1. Office, bulkheads, sheds, etc. at $5000 cost, estimated at $1000 annually	$0.50	
Dispatcher—office man—plant man		$2.20
2. Weigh batch loader at $8000	3.20	
3. Conveyor and water system at $2000	.60	
4. Two 3-cu. yd. truck mixers at $13,000	5.20	
Drivers		3.86
Totals	9.50	6.06
Grand total		$15.56
Approximate plant and truck mixer investment		$28,000
Total average crew		3
Estimated average daily production, based on average truck mixer capacity, cu. yd.		48
Unit cost, based on all fixed and operating expenses, 48 cu. yd. daily		$2.60

The seventh and final example of a permanent ready-mixed concrete company, Fig. 7, involves the use of a front end loader, a 5-cu. yd. three-beam scale weigh batcher, conveyor, and three 3-cu. yd. truck mixers. Sacked cement is loaded into the batcher after aggregates are weighed, the batcher and mixer-loading conveyor cycle taking about 15 min. The crew is four men, plus dispatching service from the building material company office, say 4½ men. The company serves a combined town and country population of about 6000. Located in a northwestern state at about 5000 ft. elevation, concrete is poured a sur-

Fig. 6, above: Plant interior showing how sacks of cement are slit open on the bottom side by an underslung knife

prisingly high percentage of calendar days.

Example 7

Production

1. Batching cycle for 3 cu. yd. of concrete		15 Min.
2. 3-cu. yd. loads per 40 min. hour		3.3 Lds.
3. Cubic yard of concrete hourly, based on batching time		9.9 Cu. yd.
4. Cubic yards of concrete hourly, based on average truck mixer capacity		9.0 Cu. yd.

Hourly Cost of Ownership and Operation and Labor

	Own. & Opr.	Labor
1. Office, buildings, sheds, bulkheads, etc. at $5000 cost, estimated at $1000 annually	$0.50	
Dispatcher, half services		$0.83
2. Front end loader at $5500	2.20	
Plant man		2.20
3. Batcher, conveyor, and water system at $3500	1.05	
4. Three 3-cu. yd. truck mixers at $19,500	7.80	
Drivers		5.79
Totals	11.55	8.82
Grand total		$20.37
Approximate plant and truck mixer investment		$33,500
Total average crew		4½
Estimated average daily production, based on average three truck mixer capacity, cu. yd.		72
Unit cost, based on all fixed and operating expenses, 72 cu. yd. daily		$2.26

Summary of Permanent Plants

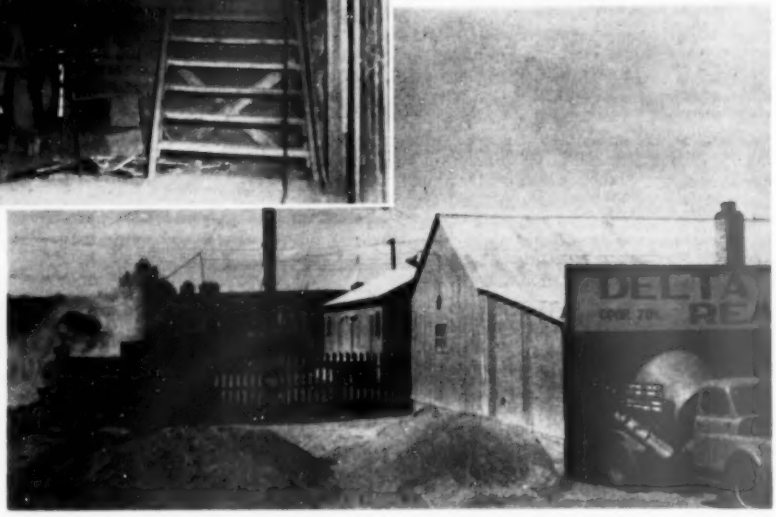
1. Average total plant and truck mixer investment	$32,000
2. Average number of 3-cu. yd. truck mixers	3.1
3. Average total crew	4.6
4. Average batching and mixer loading cycle for 3 cu. yd. of concrete	11.9 min.
5. Average 8-hr. daily production, based on either 67 percent plant capacity or truck mixer capacity, whichever is the lower, cu. yd.	78
6. Average hourly cost of ownership and operation of entire setup	$20.80
7. Average total unit cost for plant and truck mixer operation per cu. yd. of concrete	$2.14

(To be continued)

LEEMAN GAMMON, Flat River, Mo., has opened a ready-mixed concrete plant at Elvins, Mo.

Lane Co., Port Arthur, president; T. L. Amis, Wamix, Inc., Dallas, vice-president; and J. J. Randol, Fort Worth Sand & Gravel Co., Fort Worth, vice-president. The directors are H. M. Lacey, Gifford-Hill & Co., Dallas; Weaver Cunningham, West Texas Concrete Products, Odessa; W. A. Kelso, W. A. Kelso Building Materials Co., Galveston; D. P. Wheat,

Fig. 6, below: Exterior view of small plant which is in a mountain town of 4000 population



Texas Ready-Mix Meeting

THE TEXAS READY MIXED CONCRETE ASSOCIATION held its first annual meeting in Austin, Texas, June 26-27, 1953.

H. M. Lacy, vice-president of Gifford-Hill & Co., and retiring president of the association, reported that the association, in its one year's existence, has grown to an active membership of 44 companies.

C. S. McLellan, executive director, reported the passage of legislation in the recent Texas legislative session which permits ready-mixed concrete trucks to have a tandem axle load of 36,000 lb. for two more years, the limit for other trucks being 32,000 lb. Mr. McLellan also reported the defeat of a proposed bill levying a 1 percent gross-receipts tax on ready-mixed concrete production, as well as the defeat of a production tax on all aggregates.

Social highlights of the meeting included a buffet dinner and floor show the first evening, and a "Texan-style" barbecue the second evening, on the shores of Lake Austin, followed by a moonlight ride on a stern-wheel river boat. Wick Fowler, noted war correspondent and now administrative assistant to Governor Allan Shivers, was the principal speaker at a luncheon for the producers. The wives were entertained with a visit to the governor's mansion.

Association officers for the coming year include: Scott D. Clark, Brown-Transit Mix Concrete & Foundation Co., Beaumont; Lawrence Fuqua, South End Building Materials Co., Houston; and N. L. Fox, Valley Ready Mix Concrete Co., Harlingen, Texas. C. S. McLellan will remain as executive director, with headquarters at 907 Congress Ave., Austin, Texas.

Concrete vs. Black Top

PORTLAND CEMENT CONCRETE won out over bituminous concrete in bids received by the Maryland State Roads Commission, as recently reported in *Construction* magazine.

James Julian, Elmere, Del., contractor, proposed to construct a 9-in. reinforced concrete dual highway in Wicomico County for $666,646, with T. Edgie Russell of Frederick, Md., submitting a bid of $731,175 to build a 15½-in. thick highway on the same 2,577-mile stretch. Other bidders, all on portland cement concrete were: George & Lynch, Inc., Wilmington, Del., $672,918; Robert T. Main Co., Salem, Va., $696,678; Bero Engineering & Contracting Co., $732,231; Wilson Contracting Co., Inc., $801,028; and F. P. Asher, Jr., & Sons, Inc., $808,504. The contract proposals covered grading, drainage and surfacing along a relocation of U.S. 13, near the Maryland-Delaware boundry.

The flexible pavement alternate involved a 2-in. screening foundation layer; 5 in. of macadam base; 5 in. of macadam base surface treated; 2 in. of bituminous concrete base and 1½ in. of bituminous concrete surface.

N.C.M.A. Directors' Mid-Year Meeting

THE BOARD OF DIRECTORS of the National Concrete Masonry Association recently held their mid-year meeting at Lake Placid, N.Y., at which time they approved plans for an expanded promotion and merchandising program to be undertaken by the association in 1954. In announcing approval of the new program, Sam Paturzo, V. Paturzo, Bro. & Son, Baltimore, Md., president of the association, pointed out that it includes a well-rounded, aggressive campaign of

Sam Paturzo, N.C.M.A. president

national advertising and publicity, local merchandising and sales aids, and public relations on both the national and local level. The objective of the campaign is to maintain and increase present markets, as well as to create and further new uses for concrete masonry products. The plan was developed by the promotion committee, aided by professional counsel, under assignment from the board.

In addition to the sessions on advertising and promotion, other committee groups met to discuss technical problems, including high-pressure steam-curing techniques and research, and a special committee met to discuss the work of local, state, and regional associations within the parent national association.

M. E. Rinker, Rinker Materials Corp., West Palm Beach, Fla., was elected president of the association for the 1954 term. Elected as vice-presidents were R. I. Lampus, R. I. Lampus Co., Springdale, Penn.; W. R. Ireland, Birmingham Slag Co., Birmingham, Ala.; and S. Carl Smithwick, Smithwick Concrete Products, Portland, Ore. Carroll Strohm, Jr., Nashville Breeko Block & Tile Co., Nashville, Tenn., will continue as secretary-treasurer.

•

EAGLE GROVE READY MIX Co., Eagle Grove, Iowa, has been purchased by Eugene Kist, also of Eagle Grove.

increases hourly yardage output over 10% with Koehring *fast-shuttling* DUMPTORS

THERE is no need to turn at the loading unit, along narrow haul roads, or on the fill with fast-shuttling 6-yard Dumptors. Koehring constant-mesh transmission gives the same 3 fast speeds forward and reverse, lets Dumptors operate with equal ease in both directions. Every turn saved cuts 15 seconds off your cycle time, and adds up to an important increase in yards hauled per hour. Here's a typical example:

On a 1,000-foot haul, eliminating only 2 turns saves ½ minute every round trip. Where you would get an average of 13.6 trips per hour with 2-turn operation, Dumptor *no-turn shuttle hauling* gives you 15.4 trips — an increase of 1.8 trips an hour on the same 1,000-foot haul.

Fast, easy spotting and 1-second gravity dump help keep production high. Costs stay low because there are no complicated, mechanical body hoists to slow up haul cycles — no expensive hoist maintenance or down time to eat into your profits. Let your Koehring distributor show you Dumptor's many other cost-cutting advantages.

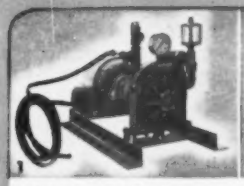
KOEHRING COMPANY, Milwaukee 16, Wis.
Subsidiaries: JOHNSON • PARSONS • KWIK-MIX

KOEHRING (KOEHRING HEAVY DUTY) **DUMPTOR®**

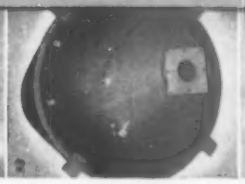
CE288

This mountain-side job shows typical no-turn shuttle advantage. Hauling along narrow ledge, Dumpter spots close to Koehring 1½-yd. 605, gets its load, drives to fill, dumps, returns to shovel — without turning.

INCREASE BATCH PLANT PROFITS *with Johnson accessories*



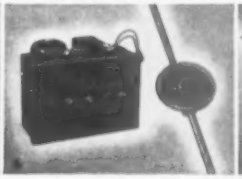
Rotary Vane Compressor gives 7 cu. ft. air pressure per min. cement aeration. 15-lb.-limit relief valve.



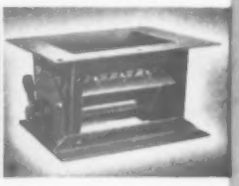
Aeration Fittings properly spaced in Johnson bins and silos keep cement free flowing.

2-Way Elevator Discharge Valve, a flop-type chute, directs flow of cement to the storage tank.

Pivoted Distributor feeds aggregates to bin sections. Positions and locks by ground control wheel.

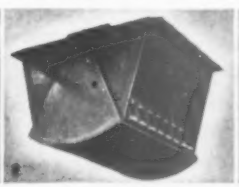


Bin Signals accurately register high and low levels in cement or aggregate. Dust-proof.



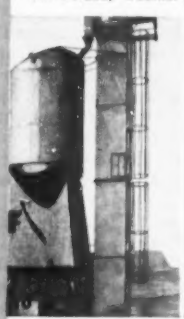
Rotary Plug Valve accurately controls cement flow. Plug operates freely in self-aligning bearings.

Receiving Hopper 30 and 50-bbl. sizes, feeds bulk cement to elevator. All-welded, weather-proof.

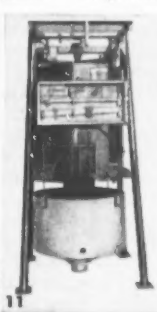


Aggregate Fill Valves single clam, radial type for jam-proof closing. Hydraulic pressure lubrication.

Tunnel Gate for stockpile reclamation. Single radial clam. Skirt board is hinged, opens and locks securely.

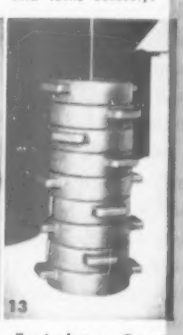


Safety Cage of 28" steel, welded to casing, can be furnished with all Johnson elevators.



Water Weigh Batchers, semi- or full-automatic types. 120 and 240-gal. sizes available.

Elevator Buckets in many sizes for aggregates, and cement. **Steel Chain** has carburized knuckles.



Batcher Test Weights in sets of nine, 50-lb. calibrated units, and two 25-lb. steel hangers.

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CHAMPAIGN, ILLINOIS
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Western Concrete Products Meeting

THE CONCRETE PRODUCTS ASSOCIATION OF WASHINGTON held its 24th annual summer meeting at the Hotel Monticello, Longview, Wash., with guests from as far as Denver, Colo., and Calgary, Alberta, as well as from Washington, Oregon and British Columbia, in attendance.

The meeting was opened with an informal "get acquainted" party, which included a cocktail hour, dinner and dance.

Since this is the yearly social meeting of the association, business activities were confined to one morning's session which consisted primarily of committee reports and the election of officers for the ensuing year. B. E. Harrison, president, Harrison Pipe Co., Tacoma, Wash., was elected president, with George F. Ruth, assistant vice-president, Long-Bell Lumber Co., Longview, Wash., as vice-president. E. Ellis Cummins, Yakima Cement Products Co., Yakima, Wash., was elected secretary and Verne Frese, Layrite Concrete Products of Seattle, Inc., Seattle, Wash., was elected treasurer. Elected as directors were: R. W. Condon, Graystone Concrete Products Co., Seattle; W. S. Wilson, Graystone Materials Co., Olympia; and James B. Lundberg, Lundberg Concrete Pipe Co., Tacoma.

The annual association banquet, presided over by retiring president R. W. Condon, was highlighted by paying tribute to Mr. and Mrs. C. M. Howard. With regards to Mr. Howard's recent retirement as engineer-manager of the association, W. F. Paddock, Graystone Concrete Products Co., Seattle, recounted the history and development of the association, with particular emphasis on Mr. Howard's activities in and service to the organization. Mr. and Mrs. Howard both were presented mementoes, in appreciation to Mr. Howard for his outstanding service to the concrete products industry, and to Mrs. Howard in tribute to her assistance in association activities.

Guest speaker at the banquet was H. W. Shoemaker, vice-president and general manager, Reynolds Metals Co.'s Longview plant, whose talk, entitled "King Solomon's Mines" was well received by the group. Upon conclusion of his talk, Mr. Shoemaker invited the association members and guests on a tour of the Longview plant.

The closing day of the meeting was devoted to the Longview plant tour and social activities of individual choosing.

Lightweight Aggregate Research Program

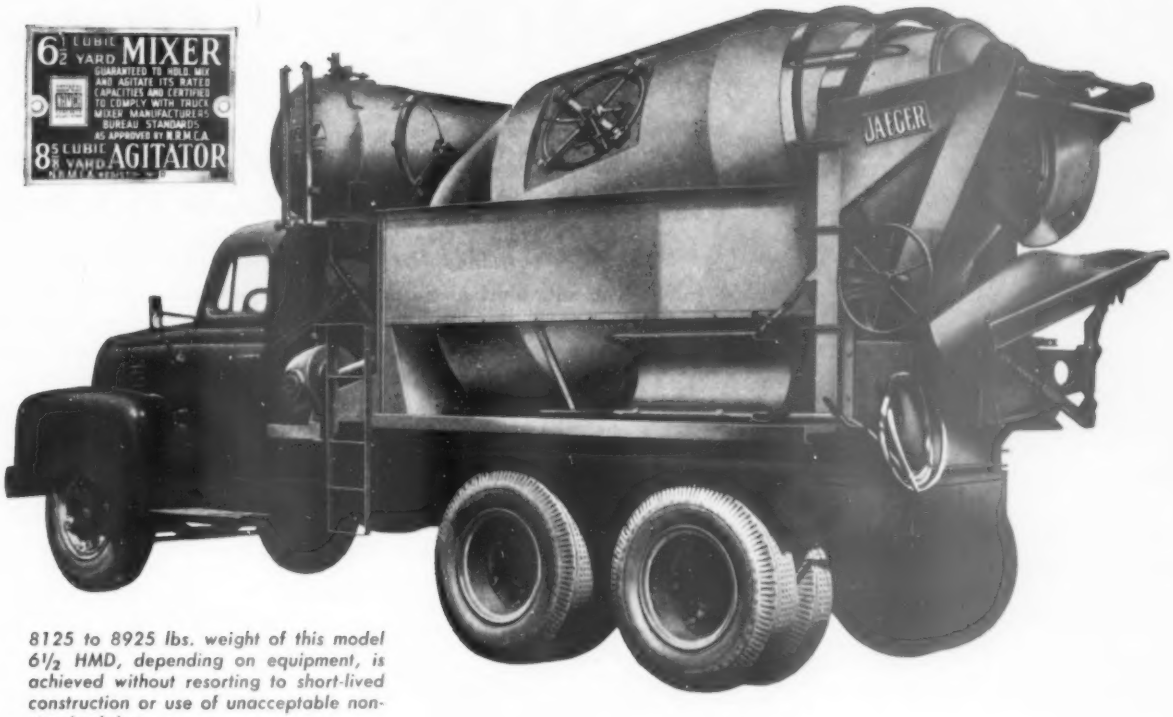
THE EXPANDED SHALE INSTITUTE has announced the inauguration of its first research program which embraces a study of the structural concrete performance of the 21 lightweight aggregates produced by member companies from fourteen states and from Canada. The research is being carried on at the University of Toledo, under the direction of Professors E. L. Saxer and John Seldon, of the university's Research Foundation. This project will be followed by other correlated research to develop design criteria and other facts for the construction industry.

Members of the institute's technical committee, along with Frank G. Erskine, managing director, will act in an advisory capacity. The committee members are Cedric Willson, Texas Industries, Inc., Dallas, Texas, chairman; George Bickel, The Featherlite Corp., Dallas, Texas; W. W. Allen, Jr., Hydraulic-Press Brick Co., St. Louis, Mo.; William Thomas, McNear Brick Co., San Francisco, Calif.; I. P. Brettell, Cooksville Co., Ltd., Toronto, Can.; Carleton Smithwick, Smithwick Concrete Products, Portland, Ore.; William Poston, Poston Brick & Concrete Products, Springfield, Ill.; and Philip Comstock, Kentucky Light Aggregates, Inc., Louisville, Ky.

In making the analysis for the Expanded Shale Institute, its engineers will use a blend of four portland cements for all concrete specimens. Aggregates will be separated on standard screens and recombined to a uniform grading. Tests will be performed to determine this uniform grading.

Four mixes of 2½-in. slump, containing four, five, six and seven sacks of cement per cu. yd., will be made with each aggregate. A 3- x 4- x 16-in. specimen has been selected for its versatility in research. In addition to flexure and compressive strengths, shrinkage and sonic modulus will be determined.

Service pins at the 5-, 10-, 15-, 20- and 25-year levels were recently presented to employes of Universal Concrete Pipe Co., Columbus, Ohio, at a "Service Award Banquet." Presentation of the awards were made by H. E. Eschenbrenner, Jr. (front center), executive vice-president. The rest of the group includes executives and office and plant employes receiving awards



8125 to 8925 lbs. weight of this model 6½ HMD, depending on equipment, is achieved without resorting to short-lived construction or use of unacceptable non-standard drum.

If it fell in the river, this truck mixer would actually float . . .

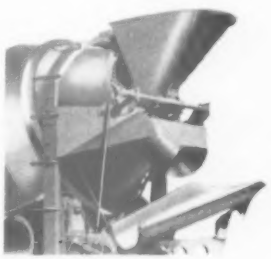
We're not kidding. This complete 6½ yard unit, including 12,200 lb. truck of 195" wheelbase, not only weighs thousands of pounds lighter than the same cubic volume of water, but also has a *water-tight* and *air-tight drum.*

The positively sealed top-loading door and rear discharge door are designed for wet-mix plants, to enable them to transport full drums of pre-mixed concrete completely protected from loss of moisture and exposure to weather.

You may never require such a sealed drum. Millions of people have never seen one. But the fact is that a substantial number of ready mixed producers in the Eastern and Central states need this type of equipment. *And Jaeger alone, as the leader of the industry, provides it.*

To fit *your* type of operation, this same MIX-PLUS model is also available with either sealed end-loader or light open-end loader equipped with Jaeger's exclusive "Back Away" gate, and water system to suit.

All models offer the same advantages of faster charging, mixing and discharging with Jaeger's "Dual Mix" drum, faster spotting with Jaeger's 13 ft. "To-the-Spot" chute, and quicker tempering on the job with Jaeger's high pressure water jet, located in the head of the drum.



For full information, see your Jaeger distributor or send for Catalog TMH-2.

THE JAEGER MACHINE COMPANY

603 Dublin Avenue, Columbus 16, Ohio


COMPRESSORS


PUMPS


LOADERS


CONCRETE MIXERS


TRUCK MIXERS


PAVING MACHINES

50 Years of Service...to the

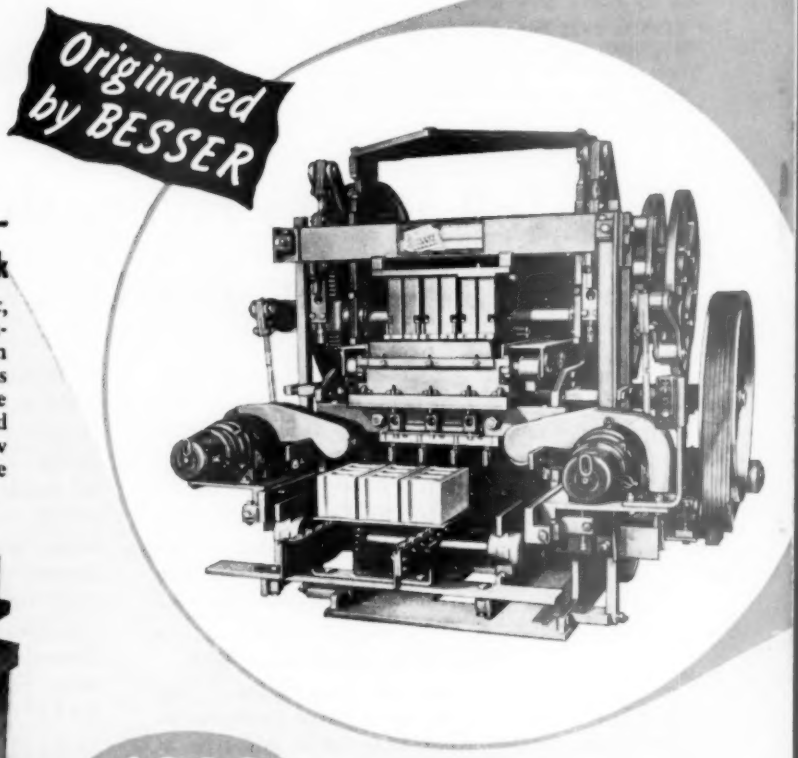
BESSER AUTOMATIC VIBRAPAC—the Concrete Block Machine that's Often Imitated, but Never Equalled

Only a Genuine Besser Vibrapac Can Give You Sustained TOP Production of High Quality Block

You want block machines that are designed and built to produce the highest quality block, on a fast production basis, day after day, month after month, *without downtime.* Then be sure to consider the firm behind the machine. How long has this firm been in business? Have you assurance it will remain in business? How about its engineering and service facilities? What has the company contributed to the Concrete Products Industry? These are all vital factors that must be considered when selecting block machines. Frankly, can you think of any company that measures up to these standards better than the BESSER Manufacturing Co.?

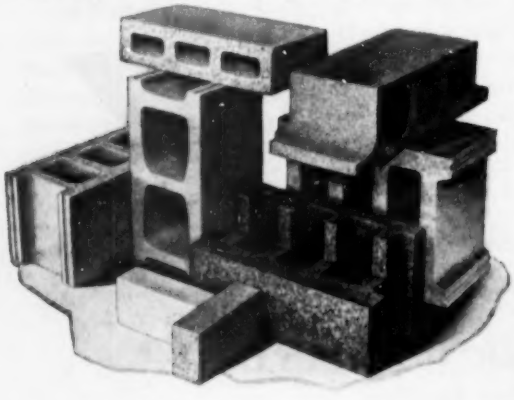
1904

One of the original concrete block machines designed by Besser. This early model used cored pallets and was hand-operated.



BESSER AUTOMATIC VIBRAPAC— Produces ALL Sizes and Types of Block

The flexibility of the Front Pallet Feed Vibrapac, and the advantage of the original Besser principle of making all sizes and types of block on *one set of Plain Pallets,* permit Vibrapac plants to supply a wide variety of block for the entire building, including Soffit Block for floors and roofs, Pilaster Block, Bond Beam, Window Jamb, Chimney Block, Beam Lintel, Bull Nose Block, Brick Header Block, Brick, etc., etc.



1939

The year the Besser Automatic Vibrapac was first introduced to meet the greatly increased demand for greater volume production of quality Concrete Block. The Besser Off-bearing Hoist was developed, thereby giving the world the first Power Handling of Block. It enables one man to off-bear the entire machine production.

Use *Genuine* Besser Vibrapac Machines . . . Use *Genuine* Besser Parts

BESSER

Complete Equipment for Concrete Products Plants

BESSER MANUFACTURING COMPANY • ALPENA, MICHIGAN, U. S. A.

Concrete Products Industry!

BESSER Research and Development Has Advanced Concrete Block Machinery from the Original Hand-Machine to the Present Automatic High-Production VIBRAPAC

For nearly 50 years, the Besser Manufacturing Company has devoted its constant and untiring efforts to the manufacture of concrete block machinery, pioneering new types of machines, and improving production methods, thereby attaining higher standards for the Industry. The Front Pallet Feed Vibrapac is the result of that half-century of pioneering and developing. The machine sets the pace for modern production and handling devices, and even more important, it maintains that pace, day after day, month after month, easily withstanding hours of continuous high production. The savings effected through elimination of downtime, helps to boost your profits.

1953

Front Pallet Feed Vibrapac — the World's leading concrete block machine. You merely press the starting button and then the machine operates automatically for continuous production of high quality block, day after day, month after month, *without downtime*. Electric panel controls the automatic cam operation which produces block of exact height and density. Power for vibration has been increased up to 100%. Off-bearer removes finished block with power hoist, and, without additional effort or time, returns the empty pallets to the machine. No manual lifting. Off-bearer merely guides the power hoist.

Products Plants Operating 4 or More VIBRAPACS

Atlas Constructors
Fedala, Morocco, North Africa

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El Paso, Texas

Basalt Rock Co.
Napa, California

Best Block Co.
Metuchen, New Jersey

Borin Lumber & Fuel Co.
Detroit, Michigan

Builders Supply Corp.
Phoenix, Arizona

The Cincrete Corp.
Long Island City, New York

Cleveland Builders Supply Co.
Cleveland, Ohio

Columbus Concrete Products Co.
Toledo, Ohio

Compania Anonima La Concretera
Caracas, Venezuela

J. Cooke Ltd.
Aldershot, Ontario, Canada

Illinois Brick Co.
Chicago, Illinois

Layrite Concrete Products
Spokane, Washington

Marietta Concrete Corp.
Marietta, Ohio

Maule Industries
Miami, Florida

Multiplex Concrete Co.
East Orange, New Jersey

V. Paturzo, Bro. & Son, Inc.
Baltimore, Maryland

Picone Brothers
Brooklyn, New York

Reading Concrete Products, Inc.
Cincinnati, Ohio

San Xavier Rock & Sand Co.
Tucson, Arizona

Southern Block & Pipe Corp.
Norfolk, Virginia

Spickelmier Co.
Indianapolis, Indiana

Charles Svec, Inc.
Cleveland, Ohio

Texas Concrete Block Co.
Lubbock, Texas

Texas Industries, Inc.
Dallas, Texas

Universal Concrete Pipe Co.
Columbus, Ohio

York Building Products
York, Pennsylvania

Today's Front Pallet Feed Vibrapac produces premium block which accounts for the phenomenal growth of the Concrete Masonry Industry. Yearly production has now reached a total of *two billion block*.

A 7506-2PBC

BESSER

Complete Equipment for Concrete Products Plants

BESSER MANUFACTURING COMPANY • ALPENA, MICHIGAN, U. S. A.

Quality Concrete

(Continued from page 156)

be so designed to get both workability and durability? Are admixtures necessary? What refinements are worth the added costs?

Specifications should be tightened down only when considered changes will definitely benefit the concrete, structurally and economically.

A discussion on specifications would not be complete without some reference to the problem of failure to comply with specifications. Even though we are using good materials and weighing-mixing operations are under close control, we must still face the hurdle of testing reports. This matter primarily concerns compressive strength. The "alleged" failure may be actual or questionable.

An actual failure may be caused by poor aggregate, bad grading, inferior quality cement, faulty batching and mixing practices, impossible job conditions and inadequate mix designs.

The quality of concrete may also be questioned because of the failure of laboratory technicians to follow sound sampling and testing procedures. In a talk before concrete producers, Prof. Ed Saxer of the University of Toledo had this to say, "None of these tests are any better than the samples from which they are made. If they are representative samples, they are O.K. If they are not, they don't amount to much." Prof. Saxer was not being critical of testing laboratories' work. He was merely considering the problem of sampling and testing variables, a problem recognized by all right thinking specification writers and testing engineers.

On one of our jobs, several reports from a testing laboratory showed results several hundred pounds lower than required strengths. I requested that, at our expense, an independent laboratory be selected by the architect to check the findings of the test reports. The architect refused the request, advising us to the effect that our job was to furnish concrete of specified strength as determined by the laboratory handling the project.

Apparently there are some architects who profess to believe that work done by a laboratory is beyond question. Yet I know of an occasion where a reputable laboratory had its testing contract cancelled with instructions given to turn over strength cylinders, (not yet broken), to another laboratory. The replacing testing organization reported that almost half of these strength cylinders were unfit for testing purposes. This report was confirmed by an inspection of the cylinders in question.

Ready-mixed concrete producers can and do make mistakes. It is also true that a testing laboratory sometimes falters in performance. The report of an "alleged" failure brings into question not only the quality of the

(Continued on page 172)

Quality Concrete

(Continued from page 170)

concrete but also the accuracy of the laboratory's findings.

The lack of uniformity in strength results shows a serious variable either in the consistency of the materials and mixing operations or in the sampling and testing procedures.

The problem of variables should be honestly faced by the concrete producer, testing engineer and architect. Variables in materials and operations affect the quality of the concrete. Variables in sampling and testing affect the accuracy of reported results. The placing of responsibility should be based on a careful examination of the facts supported, whenever possible, by independent evidence.

Dr. Herbert F. Kriege, a highly regarded consulting engineer, recently made this statement in point: "As producers of ready-mixed concrete, I think you have every right, particularly if it is your material which is being sampled, to disqualify any test material or any test sample that you believe is not representative."

In certain areas, on specification jobs, the testing laboratory samples the aggregate and cement, designs the concrete mix, requires that an exact quantity of water and air-entraining agent be used, samples the fresh concrete, makes strength testing cylinders and prepares 7- and 28-day reports on compressive strength and some other characteristics of the concrete. The ready-mixed concrete producer weighs out, mixes and delivers the concrete. Under such conditions of divided responsibility, this question is indicated: "Just whose concrete is being tested?" What happens to the end product, the delivered concrete, if the aggregate sample is not representative, or if some changes in aggregate gradation develop or if the moisture content of the sand varies widely?

In markets where the above conditions prevail, the concrete producer is certainly entitled to have an agent present when the aggregate samples are being taken, to be given half of the sample for presentation to a laboratory of his own choice, to study and approve the suggested mix design and to get samples of the fresh concrete for the making of comparative test cylinders. In addition, in case of a questionable cylinder, the producer should have the right to make a careful inspection of the crushed specimen as well as to be represented at the laboratory whenever other job cylinders are to be broken. In fact, the evincing of such an interest on the part of a ready-mixed concrete producer should receive the complete cooperation of both the specification writer and testing engineer. All three parties should realize that they have a joint responsibility, to the owner, for the quality of the concrete in question.

It is possible to have a job in which there is no showing of segregation in the structure, yet testing cylinders clearly indicate that the control specimens are made of segregated concrete with planes of weakness appearing in the sample.

Great care must be taken that the sample is representative of the total mixture. Some technicians are able to do a good sampling job taking concrete off a chute; others get mostly mortar. The danger of poor sampling is of special concern in the placement of air-entrained concrete. If vibration is used, it is preferred to get the sample from the forms after vibration. If it is not convenient to so secure the sample, the concrete in the testing cylinder should be compacted by simulated vibration. If concrete, in place after vibration, has a 4 percent air content, a cylinder containing 6 to 7 percent air would not be a representative sample. Strength findings based on such a cylinder would be unfair to the producer.

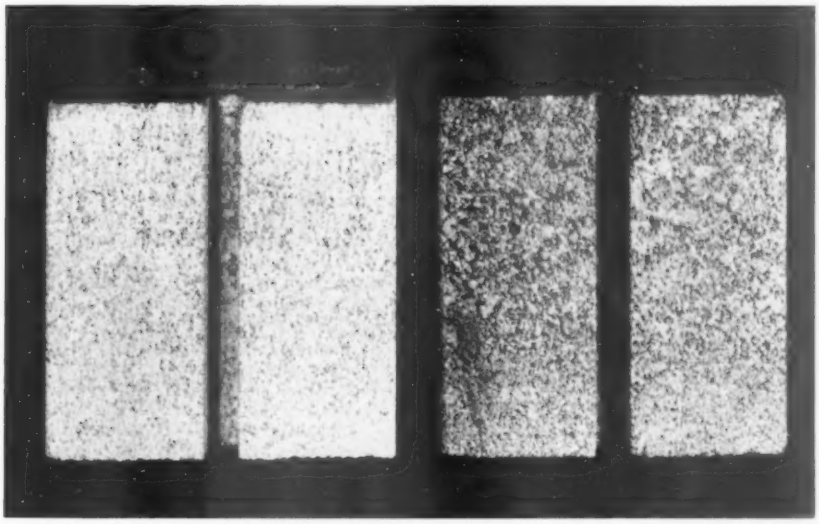
Non-representative samples are not always the fault of the laboratory technician. The presence of flat, elongated pieces (1½ in. top-size aggregate) in the narrow confines of a small cylinder can cause unnecessary trouble. These particles generally lie flat in a vibrated concrete structure. In a testing cylinder, compaction by tamping tends to stand these pieces on end, making natural sheering surfaces which are nearly always pro-

(Continued on page 174)

Better Concrete Blocks at lower operating costs by adding economical D-40

Let us show you how we have helped other concrete products manufacturers make superior blocks and at the same time reduce operating costs.

You will experience these advantages by adding a small amount of Detergent D-40 to the dry cement or wet mix.



Block A (left) made with D-40; Block B (right) made the old way. Note difference in texture, color, appearance. Sharp edges and corners.

Better appearance—smoother, whiter, finer surfaces

Greater strength—less water produces stronger concrete

Closer bonding—saves on painting and waterproofing

Reduces abrasive wear on mixing and molding equipment

Saves time—mixes pour into molds faster—"break" cleaner

Easy to use—just add to dry cement or "mix"

Economical—D-40 costs you a fraction of a cent per block

Ready-mixed concrete producers have found D-40 improves their product.

D-40 is a granular detergent widely used in manufacturing many different molded concrete products. It is supplied in 85# bags by Oronite, the world's largest producer of synthetic detergent raw materials. Because of its qualities only one to two oz. of D-40 per bag of cement is needed to obtain outstanding results. With D-40 you are assured of a stable, economic source of supply.

For complete information, samples and technical help write or call the nearest Oronite office.

ORONITE CHEMICAL COMPANY

38 SANSOME STREET, SAN FRANCISCO 4, CALIFORNIA
30 ROCKEFELLER PLAZA, NEW YORK 20, NEW YORK
STANDARD OIL BLDG., LOS ANGELES 15, CALIFORNIA
400 S. MICHIGAN AVENUE, CHICAGO 5, ILLINOIS
MERCANTILE SECURITIES BUILDING, DALLAS 1, TEXAS

ORONITE CHEMICAL COMPANY

THE NAME TO WATCH IN CHEMICALS

ductive of low strength reports.

Laboratory technicians find that the removal of flat and elongated pieces from the concrete going into cylinders, gives higher strength results; findings which are believed to be more representative of the concrete in the structure.

Many of us in the ready-mixed concrete industry have had some unpleasant experiences with testing engineers. Some of the trouble has been of our own making. We should expect and accept justifiable criticism. We can have no complaint against fair, equal treatment. We want no advantage. We are entitled to the same consideration given to our competition. An "angle shooting" technician doesn't belong in the testing business. There can be no excuse for the issuance of either a wrongful or unfair test report.

There is absolutely no excuse for a laboratory to base a 7-day report on a testing cylinder left 5 days on a job. Of course, I'm talking about a laboratory-cured specimen. In cold weather, the cylinder would not have the benefit of favorable temperature necessary to reach expected strength. In warm drying weather, the cylinder, especially one in a parafine paper mold, needs water from the second day on. Excessive evaporation occurs; the cement doesn't get a chance to hydrate and the testing report is no indication of the quality of the "placed" concrete.

In the testing of his concrete, any ready-mixed concrete producer has the right to expect the following:

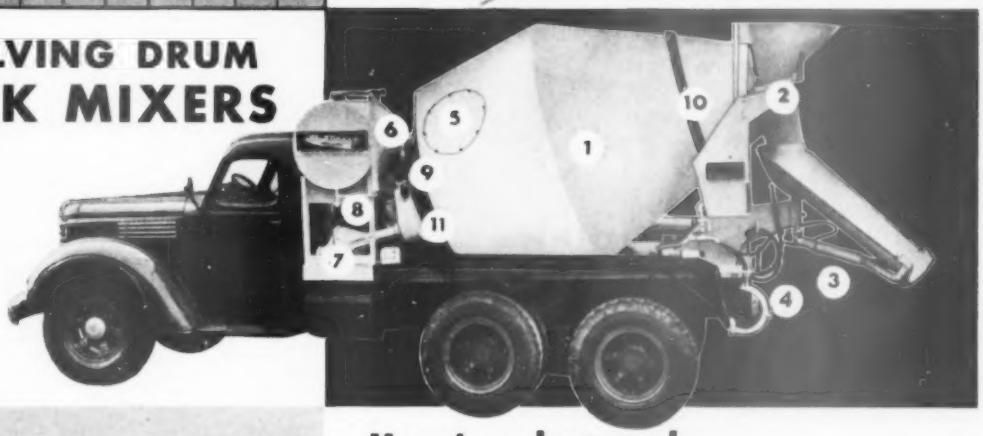
1. The taking of a representative sample.
2. Proper compaction of test cylinders.
3. The use of steel or tin jacket molds in warm drying days if results based on parafine mold cylinders are not truly indicative of the concrete's quality.
4. Adequate protection of cylinders left on the job. Damage should be avoided. A damaged cylinder should not be tested. (e.g., the scratching of an identity marking on a mold can be harmful if done at a critical time.) Any shock to the cylinder is likely to make it worthless.
5. Competent laboratory curing (e.g., on a 7-day test, the cylinder should have 6 days of moist curing.)
6. Efficient capping of cylinders for testing—very important.
7. Accurate result determinations based on a careful manipulation of the compression machine with necessary attention given to the adjustable bearing block, centering and speed of load application.

The cancellation of a contract or purchase order for ready-mixed concrete because of an unfavorable report from a testing laboratory can be a damaging blow. On concrete delivered from a well-managed operation, there is always a strong possibility that the tested specimen, which fails

More volume per day–
More profit per year

with The new ROCKET

REVOLVING DRUM TRUCK MIXERS



1. *Lightweight truck mixer. All major wear points made with abrasion-resistant Cor-Ten steel.*
2. *Unobstructed, unrestricted hopper. Chute is deep cut for fast discharge.*
3. *Hydraulic control automatically raises and lowers chute. No man-handling.*
4. *Operating controls grouped for ease of operation, controlled discharge.*
5. *Removable inspection hatch with leak-proof gasket. Easy to open and close.*
6. *Constant application of flexible power by positive chain drive. Not affected by road shock, twisting of truck.*
7. *Standard Ford parts in reduction unit, proved by years of operation. Service and repair parts available everywhere.*
8. *Powerful Ford engine and truck-type transmission. Alternate drive optional. Service available throughout U. S. A.*
9. *Dished head reinforced with ¼" bulk-head at points of maximum wear.*
10. *Three-point suspension. One-piece cast steel, precision machined ring.*
11. *Heavy front drum mounting. Main bearing is self-aligning, radial type.*

Here's what makes the ROCKET your best buy!

You get more for your money in every way when you invest in the new ROCKET truck mixer. You save on initial cost—the ROCKET sells for less because it goes direct from factory to you, eliminating the middleman and passing his profits to you as savings. The strong, lightweight ROCKET uses a small truck, enabling you to release the capital saved for other purposes. And because of this light weight, you can haul a maximum amount of concrete without exceeding state weight limits, and cut time in transit, too!

It's also a time-saver at the batching plant, due to its fast-charging action. The men-on-the-job like it especially for the new hydraulic chute control, which eliminates man-handling of the discharge chute. Controls are grouped conveniently at rear, saving steps. The ROCKET *always* delivers a homogeneous mix, eliminating segregation. As your ROCKET delivers years of dependable service, you'll see why we say: "*Feature for feature, you can't find a better buy than the new* ROCKET!"

And for Visible Mixing Action the famous

stationary drum truck mixer!

Demand the Badge of Dependability!

MAIL THIS COUPON TODAY!

Concrete Transport Mixer Co.

4987 Fyler Ave.• St. Louis 9, Mo.• FLanders 7800

CONCRETE TRANSPORT MIXER CO.

Send me complete information on the new ROCKET and

- ☐ Hi-Lo Truck Mixers
- ☐ Transport Truck Mixers
- ☐ Batching Equipment
- ☐ Water Meters

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ROCK
PRODUCTS
FEATURES
TIMELY
INDUSTRY
NEWS
EACH
ISSUE

to reach expected strengths, is not representative of the concrete in the structure. There should be a provision for a hearing or arbitration. Construction contracts frequently contain arbitration clauses to cover disputes between architect, contractor and owner. Somewhere in the picture, quality concrete should be protected against the variables of sampling and testing.

Everlasting alertness on the part of the testing engineer is essential to proper evaluation of the quality of any producer's concrete.

District Representative

CURTISS M. FIGG has been appointed district representative for the Ohio, northern Pennsylvania, Michigan and northwestern New York territory of Columbia Machine Works, Vancouver,

Curtiss M. Figg

Wash. Mr. Figg has had 12 years' experience in selling and promoting concrete block machinery as well as the manufacture of concrete block. In 1936 he organized the Advance Block Co., Inc., Grand Rapids, Mich., which he sold in 1940 to become sales engineer with the Stearns Manufacturing Co., Adrian, Mich. Following three and one-half years in the United States Air Force, Mr. Figg returned to the concrete products industry, this time devoting his efforts to block plant layout, machinery installations, and the proper mix designs for lightweight materials.

Concrete Block Plant

RINKER MATERIAL CO., West Palm Beach, Fla., has completed a $250,000 concrete block plant at Fort Pierce, Fla. Plant facilities include an automatic block machine, belt, screw and bucket type conveyors, and overhead storage bins, while the surrounding yards have storage space to handle 400,000 finished block of various sizes. M. E. Rinker is president of the company. John Glenton is manager of the Fort Pierce company and Fred Hoskins, formerly plant manager at West Palm Beach, is in charge of the plant.

You'll Find it Pays to STAY with SMITH!

Owners of Smith-Mobile Truck Mixers invariably come back for more Smith-Mobiles. Why? Because they are thoroughly satisfied with the performance of their machines. They KNOW from their own practical experience that Smith-Mobiles have longer life, lower maintenance costs and LESS DOWN TIME . . . that Smith-Mobiles are designed to DELIVER MORE YARDS PER YEAR . . . give you MORE "TAKE HOME" DOLLARS. Beyond this, they know that Smith-Mobiles are backed by the world's leading concrete mixer manufacturer. So it's no wonder you see so many fleets of Smith-Mobiles in every section of the country. Once a Smith-Mobile owner . . . always a Smith-Mobile owner. You'll find it pays to stay with Smith.

SMITH
THE T. L. SMITH CO. MILWAUKEE, U.S.A.

THE T. L. SMITH COMPANY
2885 North 32nd Street • Milwaukee 45, Wisconsin, U. S. A.
Affiliated with ESSICK MANUFACTURING CO., Los Angeles, Calif.

CONCRETE MIXERS

For BIGGER and BETTER Concrete Mixers and Truck Mixers . . . LOOK TO SMITH

A 7469

Lightweight Concrete In America

Book Review by

DR. F. O. ANDEREGG

MR. T. WHITAKE of the British Building Research Station visited this country in 1950 to make a survey of the production of lightweight aggregates and their use in precast concrete products as well as in concrete cast in place.

He not only visited the government bureaus interested in this field, but also made calls at several universities doing work on lightweight aggregates, in addition to many plants producing both aggregates and precast units. Cinders, Haydite and expanded clays are discussed, in addition to the various methods of preparation and how they are used. Rotary kilns are compared with chain grates. The preparation of expanded slags is described in some detail. A series of photographs is reproduced which emphasize the dense structure achieved by the use of more fines than is common in England.

The very light aggregates, perlite and vermiculite, are considered, although lack of opportunity prevented a description of the methods used in the expansion of the latter. Mr. Whitake had been given rather full information about perlite and its products and so has been able to give a good discussion of this material. The use of these two aggregates in plaster is covered in a special chapter. An appendix describes portland cement paints. American block machines and their mass production, prestressing in certain products, and the question of shrinkage are also discussed. Mr. Whitake is under the impression that shrinkage is not too well under control in our country. Attention is also given to the addition of sufficient fines to prevent bleeding of concrete cast in place.

This report may be obtained from the British Library of Information 30 Rockefeller Plaza, New York, N.Y., for $1.10 per copy.

Masonry Design Contest

THE NEBRASKA CONCRETE MASONRY ASSOCIATION, in cooperation with the Nebraska Architects Association, is sponsoring a masonry home-design competition. A first prize of $1000 will be awarded to the best design for a small concrete masonry home. A second prize of $250 will be given along with ten Awards of Merit of $50 each. The awards will be provided by the masonry association.

The competition is open to bona fide residents of the state and to architects, draftsmen and students of architecture, registered, employed or studying in Nebraska. The prize-winning designs will be given a first and semi-public showing at the fall quarterly meeting of the Nebraska Architects Association.

Design specifications call for a one-story, with basement, three-bedroom home for the average family. The living area is to be restricted to a maximum of 1200 sq. ft., exclusive of the basement. The use of modular dimensional concrete masonry in the construction of all exterior walls and chimneys is mandatory, and the masonry must be exposed on the exterior walls, with no veneering permitted. Interior partitions shall be constructed of exposed or covered concrete masonry.

Purpose of the competition, as stated by Lew Anderson, president, Nebraska Concrete Masonry Association, is to bring about a greater interest on the part of architects, builders, building material dealers and the public in the use of concrete masonry home construction, and also to bring forth new ideas for well designed and well built homes that are within the means of a larger segment of the public.

Air Entrainment Booklet

MARQUETTE CEMENT MANUFACTURING CO., Chicago, Ill., has announced the publication of an 18-page booklet, entitled "Purposeful Entrainment of Air in Concrete," by C. E. Wuerpel, technical director of Marquette. Based on addresses given before the Second Concrete Conference at the University of Minnesota, December 12, 1952, and the 1953 Concrete Conference at Iowa State College last March 20, the booklet presents a simple narrative account of the "why," "how," and "what" of entrainment of air in concrete. Topic headings include "What It Is"; "Optimum Quantities"; "Not an Admixture"; "Effect on Strength"; and "Practical Effects." The booklet is available upon request to Technical Director, Marquette Cement Manufacturing Co., 20 N. Wacker Drive, Chicago 6, Ill.

Heads Masonry Association

ELMER R. COATS, vice-president of Mutual Materials Co., Seattle, Wash., has been elected president of the Unit Masonry Association.

Celebrates Anniversary

WATERTOWN CEMENT PRODUCTS Co., Watertown, S.D., recently celebrated its 50th anniversary. When the company was founded in 1903, concrete block were produced on a hand-operated tamper. Through a subsidiary, the Atkinson Paving Co., the company has been engaged over the years in paving sidewalks, building concrete viaducts, culverts, bridges and structure foundations. At the present, one of its primary businesses is ready-mixed concrete, with a fleet of transit-mixer trucks serving a radius of 30 miles. The company continues to supply concrete block and concrete stave silos. Merrill Allen is president of the firm, Vince Halverson, vice-president and sales manager, Ed Atkinson, second vice-president, and Harvey Werner, secretary and treasurer.

Ready-Mix Plant

LE SUEUR READY MIXED CONCRETE Co., Le Sueur, Minn., is completing the erection of a new ready-mixed concrete plant. Plant facilities include a 60-cu. yd. aggregate bin, filled by bucket elevator, the usual screw conveyors and elevators for cement handling, and two transit-mixer trucks with 3-cu. yd. capacities. The plant and equipment has been leased by Floyd Otting, who operates this new enterprise.

Many satisfied customers operating more than seventy machines.

Write for the name of nearest Oswalt-Serviced plant.

. . . why ask a crystal gazer . . .

HOW TO BOOST BLOCK PRODUCTION?

Consult OSWALT SERVICE for increasing output of your Vibrapac machine. Here is what it does for you:—

Insures high speed production without sacrifice of quality.

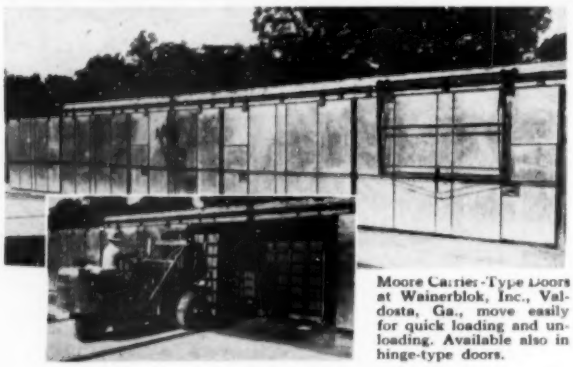
Maintains smooth operation and maximum plant efficiency.

Saves labor, cuts costs, and reduces maintenance.

Write for details of how Oswalt Service pays off in extra daily profits.

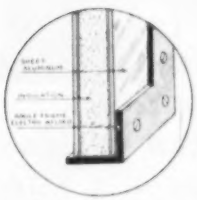
OSWALT ENGINEERING SERVICE CORP.

1335 Circle Ave., Forest Park, Ill. Phones: EStebrook 8-3666, FOrest 6-3898



Moore Carries-Type Doors at Wainerblok, Inc., Valdosta, Ga., move easily for quick loading and unloading. Available also in hinge-type doors.

Moore Metal-Insulated Kiln Doors Save Fuel—Reduce Curing Time



Keep heat where it belongs—inside the kiln—with Moore Aluminum-Insulated Doors. They improve curing conditions — save steam—last longer.

Send us dimensions of present door openings for quotation.

MOORE DRY KILN COMPANY

Oldest and Largest Manufacturers of Lumber and Veneer Dryers

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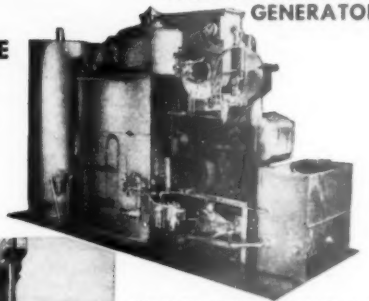
GET A LITTLEFORD "Kwik-Steam"

VAPOR • CLARKSON GENERATOR

for your
• BLOCK • PIPE
or
• READY-MIX PLANT



"Kwik-Steam" Generator is the fastest steam producing unit ever designed. **You get steam in 2 minutes time from a cold start.** "Kwik-Steam" Generators are used to heat aggregate and water at proper temperatures and produce extra steam for warming stock piles and equipment for Ready Mix Concrete Plants. This unit delivers steam only when steam is needed. The slow, troublesome steam boilers cannot supply steam for modern high-speed production. "Kwik-Steam" Generators are low cost operating, using fuel oil or gas as fuel, are completely automatic and are made in sizes ranging from 20 to 165 BHP.

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LITTLEFORD BROS., INC.
400 E. Pearl St., Cincinnati 2, Ohio

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more blocks *per minute...* more profit *per hour!*

Columbia's FULLY AUTOMATIC MODEL 8, 2-BLOCK

More blocks per minute means more profit per hour when you install the new, improved Model 8. Run fully automatic or semi-automatic, it efficiently and economically produces precision blocks in any shape that can be placed in a 16x18-inch opening. 15-second cycle on 8x8x16 blocks; faster on smaller units. Built for long, continuous, trouble-free performance!

FAST INSTALLATION AND MAINTENANCE SERVICE from headquarters in Wisconsin, Ohio, South Carolina, Mississippi, Florida, New Jersey, Virginia, Washington and California.

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Columbia MACHINE WORKS

107 SOUTH GRAND • VANCOUVER, WASH.

WHERE TO BUY

EXCEPTIONAL GOING BUSINESS OPPORTUNITY

Allied with our ready-mix concrete business, cement contracting and building materials, we own two valuable manufacturing and sales franchises in the pre-cast concrete field, with an active dealer organization extending over the surrounding territory. The average gross sales for each of the last five years was approximately $135,000, and the net profit has shown a steady increase. Would be a fine money-maker for a family of aggressive individuals, since two working partners could each net well over $10,000 per year, based on present earnings. Facilities and equipment include: Three almost new 3-yd. mixers, attractive modern office building, two RR sidings, 225 ton (Bucket-Elevator Charged) aggregate hopper, two flat bed trucks (one nearly new International), ¾ ton pick-up, one 36' x 70' concrete block building for manufacturing pre-cast products, and separate boiler building and boiler. All ideally located on premises with ample room for future expansion. Situated in western Illinois city in the heart of a prosperous agricultural area, with increasing industrial potential. This business could not be duplicated for $150,000. Asking price: $125,000.

BOX L-78, CONCRETE PRODUCTS, 309 W. JACKSON BLVD., CHICAGO 6, ILL.

FOR SALE
TRUCK MIXERS

We are forced to purchase larger mixers. Have for sale 2 three yard Smith's mounted on K8 tandem Internationals, being operated daily.

YORKTOWN ICE & STORAGE CORP.
YORKTOWN, VA.

GUARANTEED PERFECT CONDITION
SACRIFICE FOR $8,000

1—Stearns Model 9 Jolterete complete with dual vibration, power carriage and power offbearer.
1—8" Attachment with 4,500 pressed steel 50% air space pallets.
1—8" Header block attachment.
1—3" Attachment with 4,000 pressed steel pallets.
1—4" Attachment with 3,000 pressed steel pallets.
1—12" Attachment with 2,000 pressed steel 50% air space pallets.
60—Model 72 steel racks.

OLSEN SALES COMPANY
ROCK RAPIDS, IOWA

FOR SALE

2—Stearns No. 9 Jolteretes, equipped with dual shaft vibration, power carriage, air operated offbearers and electric height controls. Each machine with 8" modular 45° relinable attachments.
2—Stearns 42 c.f. mixers with 30 h.p. motors.
2—Stearns 42 c.f. vertical skip loaders complete with motors and starters.
1—8" Bungalo Siding attachment complete.
4", 6", and 12" modular, relinable attachments.
Press steel, modular, pallets for all attachments.
100 Chase Model 294 steel racks.
All of above equipment in extra good condition.

GUY D. MOODY
1011 Chester Street, Bristol, Va.

BARBER-GREENE LOADER

Self-propelled on crawlers, bucket type.

Operating daily.

EXCEPTIONALLY LOW PRICE

Have surplus of truck loaders.

LYNCHBURG READY MIXED CONCRETE CO.
LYNCHBURG, VA.

READY MIX PLANT

An operating Ready Mix Plant and Concrete Block Plant with Fleming No. 180 Auto Block Machine. Complete with Mixer Trucks, Dump Trucks, Silo and Bins. On Trackage. Terms.

PROPERTY SALES, INC.
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USED PUMPS FOR SALE
TO SETTLE AN ESTATE

1 Gould #28081, 6"x6" for belt drive $210.00.
1 Gould 3"x5" for belt drive, $100.00.
1—5" Centrifugal dredge pump, $150.00.

LAKE SUPERIOR YACHT YARD
Marquette, Michigan

LOWER COST
PACKER-HEAD WINGS
Proved to last as long or longer—yet cost considerably less. Write for prices.
TEXAS FOUNDRIES
LUFKIN, TEXAS

FOR SALE

Stearns Clipper Stripper block machine with 1,000 cast iron pallets and 14 cubic foot mixer with motor. Excellent condition. $800.00 F.O.B. LEBANON, IND.

STOWERS CEMENT PRODUCTS
Phone 23 440 W. Elm St.

FOR SALE

32—24" cast pallets, base ring type.
3—24" top rings.

UNITED STATES CONCRETE PIPE CO.
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WANTED

Rock-out mould box for Stearns or Anchor stripper, with rock and panel faceplates.

PORTERS CONCRETE PRODUCTS
Water Works Road, Berrien Springs, Mich.

UNBREAKABLE
PALLET RINGS
Write for full information
TEXAS FOUNDRIES
LUFKIN, TEXAS

RACKS FOR SALE

Five High, Three Bay, Holding Ninety 8x8x16 Blocks. Accommodates 18½"x26" Pallet.

The Waterbury Ready Mixed Concrete Co.
94 Benedict St., Waterbury, Conn.

CEMENT COLORS

Write for free samples and prices of "LANSCO" CEMENT COLORS produced in 50 attractive shades. Packed in bulk and in 1 lb. and 5 lb. packages.

manufactured by
LANDERS-SEGAL COLOR CO.
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WANTED

ABOUT 40 RACKS FOR JOLTCRETE NO. 9 FOR SPADE OFFBEARER. ADVISE CONDITION AND PRICE.

UNITED BUILDING MATERIAL CO.
BOX 992 ASHEVILLE, N. C.

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Has The Largest ABC Circulation and Highest Renewal Percentage in the Non-Metallic Minerals Industry

WANTED: Septic Tanks that need cleaning!

BIONETIC is a safe, sure, economical method.
Cleans sewage solids from tank.
Eliminates odors.
Cleans tile fields, prevents plugging.
Cleans grease traps.
Harmless to humans and plumbing.

BIONETIC at $4.25 per pound, or case of 12 one pound containers $48.00, 25 pound drum $3.25 per pound.
Some Dealer and Distributor Franchises open.
Advisory Service, write us.

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FREE SERVICE for Buyers

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- ___ Aftercoolers, Air
- ___ Agitators
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- ___ Bagging Machines
- ___ Bags
- ___ Barges
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- ___ Belting, Conveyor, Elevator, Power Transmission
- ___ Belting, V-type
- ___ Belt Repair Equipment
- ___ Bin Level Indicators
- ___ Bins and Batching Equipment
- ___ Bits
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- ___ Tractor Shovels
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- ___ Trailer Dump Bodies
- ___ Trucks, Bulk Cement
- ___ Trucks, Industrial
- ___ Trucks, Mixer Body
- ___ Trucks, Motor
- ___ Valves
- ___ Vibrators
- ___ Welding and Cutting Equipment
- ___ Winches
- ___ Wire Cloth
- ___ Wire Rope

If equipment you are in market for is not listed above, write it in the space below.

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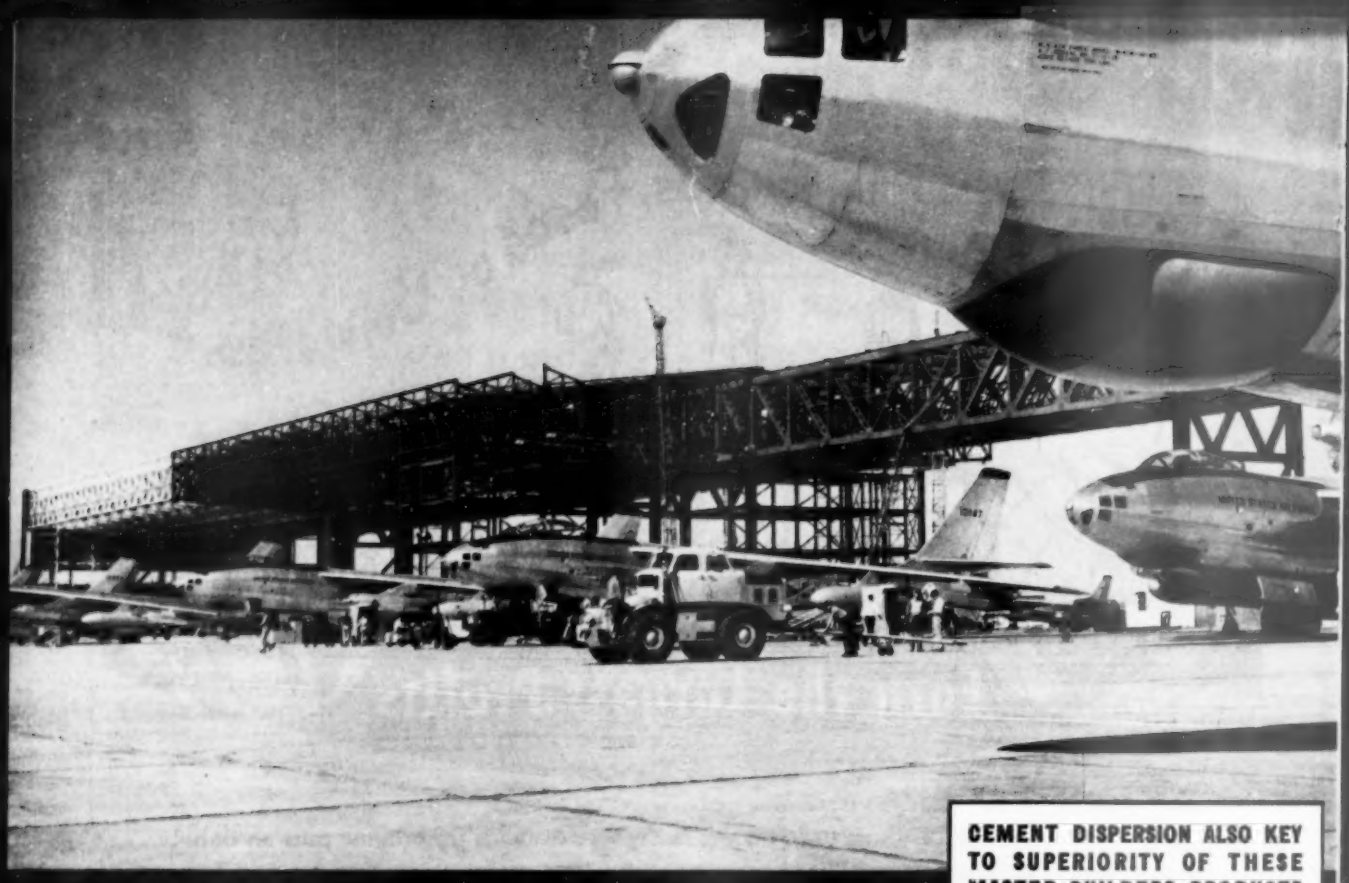


Boeing Airplane Co., Wichita, Kansas. Pozzolith Concrete used in apron and hangar. Consltg. Engr.—Wilson & Co., Salina, Kansas; Hangar Contr.—Manhattan Construction Co., Inc., Muskogee, Okla.; Hangar concrete supplied by Walt Keeler Concrete Co., Wichita, Kansas; Apron Contr.—Peter Kiewit & Sons Co., Wichita, Kansas, who also produced the concrete for apron.

120,000 Cu. Yds. of Durability...

POZZOLITH CONCRETE

Low unit water content and increased durability are among the important reasons for the wide use of Pozzolith Concrete in such projects as Boeing's 4,000′ x 800′ apron and many other types of exposed concrete work.

In tests conducted by the Nation's Highest Testing Authority, using a range of cements typical of all U. S. cements, Pozzolith Concrete specimens had up to 400% greater resistance to freezing and thawing than ordinary concrete.

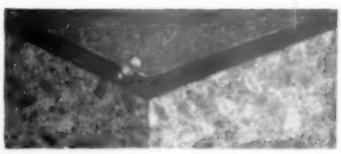
Pozzolith, cement dispersion, provides maximum durability — with maximum economy — because it (1) *reduces unit water content* by approximately 15% (2) entrains the optimum amount of air and (3) fully complies with the water-cement ratio law — basis of ACI and ASTM procedures of design, specification and production.

Full information on Pozzolith and "see-for-yourself" demonstration kit supplied on request . . . without cost or obligation.

CEMENT DISPERSION ALSO KEY TO SUPERIORITY OF THESE MASTER BUILDERS PRODUCTS

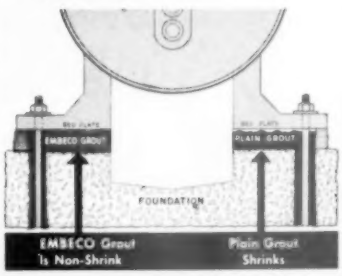
MASTERPLATE . . .

Masterplate produces "iron-clad" concrete floors with 4-6 times longer life; also spark-safe, non-dusting and easy-to-clean. Non-colored and colored. For new floors and resurfacing.



EMBECO . . .

Embeco (1) produces flowable, non-shrink, ductile grout which . . . (2) gives full, level, lasting bedplate contact . . . (3) helps avoid costly shutdowns.



the MASTER BUILDERS Co.

Subsidiary of American-Marietta Company

WHERE TO BUY

CLASSIFIERS: 4—Akins 54"x34' and 4—Wemco 78"x28½', Simplex, double pitch, weir type, with 220/440 volt syncrogear motor and lifting device. Four located in Nevada. NEW condition.

JAW CRUSHER: 1—Telsmith 18 x 32 roller bearing Jaw Crusher, V-belt drive.

PORTABLE CRUSHING PLANT: Cedar Rapids 2 unit Plant, 40 tons per hour, used only four months.

CRUSHERS: 1 — 16" Superior McCully with 125 HP motor and V-belt drive. 1—Allis Chalmers, all steel, type R548, with 125 HP motor and V-belt drive.

AIR SEPARATORS: Bradley 16 ft. and Sturtevant 10 ft. with or without motors.

PULVERIZERS: Hardinge steel lined conical Ball Mills complete with motors and auxiliary equipment for dry grinding, sizes 5'x22", 10'x36", and 10'x48".

COMPRESSOR: Chicago Pneumatic O.C.E., 26"x15"x18", capacity 2200 CFM, 400 H. P. synchronous motor, 2300 volt.

MINE HOISTS: Single and double drum 100 to 1500 H.P. with all electrical equipment. Complete specifications, drawings and photos available.

TUGGER HOISTS: 4—Ingersoll Rand, type 220, 20 H.P., 220/440 volt, cap. 2640 lbs. pull, 250 FPM, weight 2160 lbs. Excellent condition.

LOCOMOTIVE: 65 ton Diesel Electric, 0-4-4-0. For sale or rent.

LOCOMOTIVE CRANE: 25 ton capacity, thoroughly modern, gasoline powered, cast steel trucks, air brakes, with or without 1½ yd. clam shell bucket. For sale or rent. Located Minnesota.

CLAM SHELL BUCKET: Blaw Knox size 7250, 2½ yd. capacity, NEW condition.

BOOT BUCKET ELEVATORS: Buckets size 12"x7", 40 ft. center to center, with motors and drives.

PORTABLE BELT CONVEYOR: Barber Greene, 24" belt, 50 ft. long, gasoline motor, NEW condition.

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Welded
Seamless
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Supplies of Fittings
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Power Piping Fabrication
SPEED-LAY Pipe System
Quick Assembly
Economical, Light Weight
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PIPE SUPPLY CO., INC.
Berry at North 13th Sts., Brooklyn 11, N. Y.
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Quarry Equipment

2540 Cedarapids 4A primary unit, diesel power.
2036 Cedarapids AAA portable primary, diesel power.
1036/3418 Cedarapids Jr. Tandem on rubber.
Cedarapids Rock-It plant w/2035 jaw, 3033 hammermill.
2020 Cedarapids double impeller. New condition.
4024 Cedarapids roll. Rebuilt.
3018 Cedarapids roll. Rebuilt.
936 Telsmith Wheeling Jaw.
1047 Allis-Chalmers Blake type jaw crusher. Rebuilt.
#1 Cedarapids Kubit impact breaker. New condition.
B-3 Jeffery swing hammer pulverizer. Rebuilt.
60" dia. x 14' Traylor revolving screen. Rebuilt.
15 cu. yd. Cedarapids sand drag. New.
60-ton, 2-comp., 8'x18' storage bin w/clam gates.
Special bins to your specifications.
Conveyors—18"—24"—30"—36". Also belt.

SHOVELS AND CRANES

Lorain 77, 1½-yd. diesel.
Lorain 76B, 1¼-yd. diesel.
Lorain MC-4 Moto-Crane.
Link Belt LS65 Diesel Combination.
Unit 514, ½-yd. gasoline crawler shovel, rebuilt.
Lorain 30A, ⅜-yd. gas combination.

WELL DRILLS & TOOLS

Sanderson-Cyclone No. 42 well drill.
Sanderson-Cyclone No. 44 well drill.
1952 Model 40 Keystone w/truck & tools.

TRUCKS

27FD rear dump Euclids.

AIR COMPRESSORS

500 cu. ft. Gardner-Denver diesel, rebuilt.
365 cu. ft. Gardner-Denver. New condition.
105 cu. ft. Schramm gas powered on 4 steel wheels.
Worthington 2-stage, water-cooled, vertical 250#, 60 CFM, new condition.

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CAMP HILL, PA.
Phone Harrisburg 7-3431

Gruendler 2XA hammermill, 24"x14".
Stedman B30 hammermill, 30"x24".
Penna. SXT 8 mill with 125 hp motor.
Double roll 24"x14" smooth stone crusher.
Single & double roll coal crushers.
Bonded double roll cinder crusher.
Single deck 4'x6' vibrating screen.
Symons 1½ deck 4"x14' vibr. screen.
Single & double deck Universal vibr. screens.
Foundry vibr. single deck screen, 6'x8'.
Apron conveyors and belt feeders.
Champion 1030 roller bearing jaw crusher.
Sturtevant Rotary Fine Crushers, No. 00 & 1.
American 24" Standard Disintegrator.
Electric carpullers and cranes.
Enclosed chain bucket elevator, 8"x43'.
Enclosed chain bucket elevator, 16"x45'.
Open inclined elevator, 14"x60' cont.
Open inclined elevator, 10"x45' on chain.
40 gear motors, ½ hp to 15 hp.
Gear reducers, ½ hp to 100 hp.
Motors, ½ hp. to 125 hp.
Overhead electric hoists, ½ ton to 1½ ton.
Overhead air hoists, 3 ton, 12' lift.
ING. Rand double drum 5 hp electric hoist.
Sullivan portable 7½ hp. electric S.D. hoist.
2 portable 1½ hp. 110 volts winches, 500 lbs. cap.
Selected lot of chain & belt complete elevators.
Bucket elevator parts: chain, buckets, sprockets.
New 14", 16", 18" & 24" ball bearing belt idlers.
Used and new 30", 36" & 42" trough idlers.
New conveyor belts to 36" in width.
Used 30" conveyor belt, 500'.
End pulleys for conveyors and elevators.
Belt tripper for 16" belt conveyor.
Gravity conveyors, gears, sprockets.
Double drum 50 hp. Hunts hoist, tandem type.

G. A. UNVERZAGT & SONS
136 Coit St., Irvington, N. J.

Special Crushers ! !

Raymond High Side 4 roll Pulverizer, No. 8047
Pennsylvania C-4-30 Reversible Hammermill.
Cedar Rapids 4033 Hammermill. Diesel powered.
Raymond No. 412 bowl pulverizer mill.
FARREL BACON 36" x 48" Jaw Crusher.
Traylor TY 4' with 200 hp. electric motor.

DREDGES

Ellicott 12"x10" new pump with new V-12 885 HP Diesel engine. Port. steel hull.
Ellicott 8" with cutter. Diesel Hull 45'x18'x3'6".
8" Hydraulic. Diesel. On 32'x8' steel pontoons.
Amsco 10" Diesel power portable. Excellent.
6" portable Diesel complete with cutters, etc.
8" H-P twin Diesel drive. Complete.

CONCRETE PLANTS AND EQUIPMENT

Heltzel 1000 bbl. cement silo with elev., scales, etc.
Smith 56-8 two yard tilting mixer. Complete.
Port Erie Strayer Concrete Plant 30-60 T.P.H.
Blaw-Knox 300 ton 4 compt. aggr. bin.
54-B weighbatcher conveyor truck hopper apron feeder bucket elevator.
Butler 87 Cement Track Plant 250 bbl. p.h.
Large plant 212 yd 6 compts. agg. & cement elevators, 56-8 Mixer.
Butler 250 bbls. cement bin with B-K 100 ton 3 compt. agg.
NEW F-8 100 ton agg. bin 3 compt.
NEW F-8 400 bbl. cement bin complete.

CRUSHING PLANTS

Cedar Rapids Portable Super Tandem, excellent.
Pioneer 40-V. New 1946. Portable. Diesel power
Pioneer WA 300, crushing, washing, screening.
Cedar Rapids AAA Port. Primary crusher 20x36.
Cedar Rapids 40x33 Port. Secondary. Diesel.

CRUSHERS

JAW: Acme 10x20, 14x26, 14x28, 10x42, 16x32, 18x32, 25x40. Eagle 20x36. Diamond 24x36". Cedar Rapids 10x20, 20x36, 25x40. Farrell 10x20, 13x30, 14x36, 18x36, 36x48. Buchanan 36x42. Good Roads Reliance 15x30. Traylor 18x36, 24x36. Allis-Chalmers 30x18. Good Roads 10x30. Telsmith 18x32. Champion 1030, 1040, 1234, 1636.
GYRATORY: Allis-Chalmers-McCully, 6", 7½", 8", 9", 12K, 20", 26", 42", 14". Newhouse, 24", 36". Gyrasphere, 18", 28". Intercone Telsmith, Telsmith 5H, 10-B, 13-B, 16-B. Kennedy Van Saun 7, 19, 25½-S, 37. Traylor Ty 1'8". Ty 2'6", T-4½".
ROLL: Cedar Rapids 40x20. Diamond 40x22. Pioneer 30x18. Telsmith 24x16. Pioneer 30"x18". New Holland 24x16.
HAMMERMILL: Size 4 Williams Jumbo, Pennsylvania 8X2, 22x22. Cedar Rapids 20x33 Jeffrey 36x42, Jeffrey 36x24, 36x40. Dixie 3626.
BALL MILL: Hardinge 10'x48". K.V.S. 6'x8' Type M Air swept J-H 6'x6', Hardinge Conical 6'x22". Colorado Iron Works 5'x6'; Marcy No. 64½ Hardinge conical 10'x36".
ROD MILL: March 2'x8', 3'x6'. Allis-Chalmers 4'x8'. Hardinge No. E 206. Marcy 8'x12'. Hardinge 8'x22".
CONE: Symons 2' coarse bowl, 3' standard head.
TUBE MILL: Smidth 5½x20, K.V.S. 6'x7', Traylor 5'x22'.
DRIERS: Struthers-Wells 7'x64'; others 7'x20', 6'x80', 7'x70', 6'x40' and Cedar Rapids 60"x24'.

SHOVELS—CRANES—DRAGLINES

N-W 80-D 2½ yd. Dragline. Diesel. 100' boom.
N-W Model 6, 1½ yd. Diesel Shovel.
Lima Mod. 24, 1 yd. Shovel-Crane-Dragline. Gas.
Buc-Erie 51-B Diesel Shovel. Practically new.
Northwest 80-D Diesel Shovel 2½ yd. Recond.
Lorain L-820 2-yd. Shovel-Drag-Crane 100' Bm.
Northwest 80-D Shovel-Drag. New 1948. Excellent.
Lima 1201, Comb. Shovel-Drag, 80' Bm.
Lima 1201, 2½ yd. Diesel Shovel.
Manitowoc 3500, 2½-yd. High Lift Shovel.
Link Belt K-595 dragline, 2½ yd., 8 ft. boom
Buc-Erie 54-B Diesel Shovel, 2½ yd.
Lorain Model MC 414, Moto-Crane, 85' Bm. Exc.

SCREENS

Seco Double deck 6'x12'.
Kennedy-Van S. 4'x10' three deck.
Telsmith heavy duty washer 60"x13'.
Diamond 4'x16' three deck.
Lippman 4'x12' single deck.
Simplicity 4'x10' four deck.
Symons 4'x14' double deck.
Tyler 4'x10' two deck heavy duty, motor, Gen. Set.
Robbins Vibrex 3½ deck 4' x 12' Model 48-144.

TRACTORS

2 Cat. D8 Angledozers with DDPCU rebuilt.
Int. TD-18A with B-E Bulldozer.
Int. TD-24 with B-E Cable Bulldozer.
A1-Chal HD19 Angledozer, Hydraulic.
A1-Chal HD7 with Gar Wood angledozer.
Allis-Chal. HD-19 with hydraulic control angledozer.
Cat. D4 Trazcavator with 1 yd. bucket, hydraulic.

LOCOMOTIVES

45 ton G.E. Diesel Elec. Loco. std. ga.
25 ton Plymouth gas loco. std. ga.
Vulcan 20 ton standard gauge type 0-4-0 gas.
20 ton Vulcan gas, std. ga., rebuilt.
25 ton Vulcan steam std. ga. Side tank.
15 ton Whitcomb 36" ga. gas.
Plymouth Model ULDA standard gauge 10 ton diesel.

DERRICKS

Steel 50 ton stiff leg derrick 90' boom. Complete.
American Terry 20 ton Guy Derrick 199' Bm.
Clyde 30 ton stiff leg 90 ft. boom
Guy Derrick 15 tons 115' mast 105' boom
American 25 ton stiff leg derrick 90' boom.
Special 35 ton stiff leg derrick 100' boom.
Nat'l. Bridge 30 ton Guy Derrick 194 ft.
American 30 ton stiff leg 100' boom.

ASPHALT PLANTS

Madsen 4000# Port. Complete. Excellent.
B-Green Port. contin. 842 Mixer, 832 Dryer.
Overmander Monotrole Bit. Mixing Plant, T-34.
Model 8-100 Simplicity. Diesel powered.
Hetherington-Berner Moto-Paver
Pioneer Model 101, complete. New 1948.
Cummers-Road Semi-Port. 1500# Pugmill.
Cedar Rapids Travel Roadmix Plant Model 50.

CABLEWAYS

Hauerman slack line 1½ yd.; electric 90' mast.
Hauerman 1 yd. with 100 hp. electric motor, complete.
Hauerman 1 yd. with Waukesha gas hoist.

RICHARD P. WALSH CO.
38 Church St. — Cortland 7-0723
New York, N. Y. — Cable: RICHWALSH

AGGREGATE PRODUCING EQUIPMENT FOR SALE

Crushers

1—24"x36"	Portable Primary Plant Universal Model 546-P-Hopper Plate Feeder—Grizzly—Jaw—30" belt—GM 671 Diesel—New 1950—Pneumatic Tire Mounted.
1—10"x24"	Portable Secondary Crushing Plant—Universal Model #24 Twin Dual Master—Pneumatic Tire Mounted—New 1950—10 x 24 Jaw—24 x 16 Dual Rolls—Hopper—Feeder 30" Belts—Rotovator—3 Deck Screen—GM 671 Diesel.
1—40"x22"	Roll Crusher Diamond, GM 675 Diesel Driven
1—40"x22"	Roll Crusher Pioneer, GM 671 Diesel Driven
1	Telsmith Semi-Portable Sand and Gravel Plant Consisting of Screen, Bucket Elevator Intercone Model # 18 Crusher Buda Diesel Drive

Screening Equipment

1—5'x12" 2 Deck Vibrating Screen Telsmith #26S, 3 ph, 60cy, 220V Motor

1—4'x12" 2 Deck Vibrating Screen Cedarapids #13531, 3 ph, 60 cy, 220V Motor

1—4'x12" 2½ Deck Vibrating Screen Pioneer, 3 ph, 60cy, 220V Motor

1—2'x 8" 2 Deck Vibrating Screen Telsmith

Concrete Paving Equipment

2—3 cy Rex Moto Mixers, Unmounted

1—20'-25' Concrete Spreader, Blaw-Knox Model QXD732060

Miscellaneous

1—30"x100'	Pioneer Conveyor, 3hp, 60 cy, 220V Motor
1—36"x6'0"	Reciprocating Feeder Telsmith, 3ph, 60 cy, 220V Motor
1—16'6"	Bucket Elevator Telsmith
1—15 cy	Sand Drag Cedarapids, 3ph, 60cy, 220V Motor
1—23 cy	Bin Single Compartment Cedarapids
1—3	Compartment Jackleg Bin, 40 cy capacity

Other Equipment

1—Oil Heater Hopkins Volcanic Specialty Model #17 for use in handling asphalt, etc.

1—4x3 Pump Multistage, Gorman Rupp, Model 7361 Chrysler Gas

1—12x10 Wellpoint Pump, Griffin Vac. Sled-mounted, GM Diesel

1—Haiss, 1½ cy Clamshell Digging Bucket

EQUIPMENT MAY BE INSPECTED AT BRONX, NEW YORK

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JOHNSON, DRAKE & PIPER INTERNATIONAL CORP.

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86 Trinity Place — New York 6, New York — BArclay 7-3560

EIGHMY SPECIALS

Material Loaders

Pettibone Mulliken "421" Swing Loader, ¾ yd., 4-wheel drive. Demonstrated 30 hours, ½ Dealer's Cost.
Pettibone Mulliken "15" Demonstrator Front End Loader, 1½ yd., 4-wheel drive. Will discount.
Cletrac "DDH" Diesel Tractor w/Drott Hi-Lift Front End Loader, 1½ yd. Bucket.

Transit Mixers

Smith 2 yd. Hi-Discharge Mixer, used 500 yds., no truck.
Rex 2 yd. Hi-Discharge Mixer w/ Ford Truck.
Smith 3 yd. Hi-Discharge Mixer, without Truck.
Jaeger 3 yd. Hi-Discharge Mixer w/Chevrolet Tandem Truck.

Cranes & Shovels

Link-Belt "LS-40" ⅜ yd. Dragline & Fairlead.
Insley "K-10" ⅜ yd. Shovel, Crane, or Hoe. Rebuilt & Guaranteed.
Link-Belt "LS-40" ½ yd. Dragline, 30' Boom & Fairlead. Reconditioned.
Osgood "206" ½ yd. Dragline, 30' Boom & Fairlead.
Schield-Bantam "M-47" ⅜ yd. Hoe & Crane, mounted on Half Track.
Schield-Bantam "M-49" ⅜ yd. Hoe, mounted Chevrolet Tandem.
Schield-Bantam Shovel Attachment only—for "M-47".

Miscellaneous

Trailer 18-Ton Single Axle, semi Low-Boy w/ Mack Tractor. Cheap.
Waukesha "6MZ" 65 H.P. Gas Power Unit, Cheap.
Cedarapids Portable Primary Plant on Pneumatics w/1524 Jaw Crusher, 24"x6'0" Apron Feeder, gas power, 30" discharge conveyor, etc. Bargain.
Universal 880 Jr. Portable Gravel Plant, 1024 Jaw, 24 x 16 Rolls, etc., Pneumatics. Reconditioned.

Note: This equipment is all located in our yard.

EIGHMY EQUIPMENT COMPANY
ROCKFORD — **ILLINOIS**

JAW CRUSHERS

6" x 3" to 60" x 48"

Before buying or selling any FARREL-BACON JAW CRUSHERS it will pay you to consult

BACON-PIETSCH CO., Inc.
75 No. Maple Ave.—Ri 6-9700
RIDGEWOOD, NEW JERSEY
Engineers and Manufacturers
Machine Shop Facilities
FEEDERS, Conveyors, Screens, etc.
Send for Catalogue

FOR SALE

DRAGLINE BOOM 75' with fairlead and 2½ yd. bucket for 80D Northwest.

SHOVEL PARTS: Lot of new P&H 600 parts including bands.

CRUSHER SHAFT: Tapered for 1030 Good Roads Crusher. New X887.

G. & W. H. CORSON, INC.
PLYMOUTH MEETING, PA.

FOR SALE

Barber-Greene Bucket Loader

One Barber-Greene Standard Model 82-A bucket loader complete with swivel spout, 10" x 6'5" crawlers, high reverse speed, notched spirals, 42½ H.P. six-cyl. Buda gasoline engine, oil filters, self-starter and 25 gal. gasoline tank. This machine is in excellent condition, ready to work. Available immediately, subject to prior sale. Now located at Parkersburg, W. Va. Price: $5,500.00.

E. J. ALBRECHT COMPANY
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FOR SALE

Two 201 P8 heavy-duty industrial type LeRoi Gas Engines; 35 HP at 1800 RPM; wet removable cylinder liners and replaceable main connecting rod bearings; 3.92 to 1 gear reduction with drive shaft rotating counter-clockwise. Priced at $500 each. FOB Toledo, Ohio.

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ASPHALT PAVERS
LA. 1940 • TOLEDO, O.

FOR SALE—COMPLETE BLOCK PLANT

1—Kirkman 180 block machine with 8" and 3" mould box.
13—Steel racks.
1—Besser 1 bag mixer.
1200—Oiled wood pallets.
1—Truckman Lift Truck. All in good condition.

CITIZENS COAL & SUPPLY CO.
600 Bluefield Ave., Bluefield, W. Va.

FOR SALE

1—3-yard Challenge Mixer mounted on 1951, L-180 International $3,500.00
1—3-yard Challenge Mixer mounted on 1950, L-160 International $3,000.00
1—3-yard Jaeger Mixer mounted on 1947, 3-ton Dodge $2,500.00

THE LONG BELL LUMBER COMPANY
McAlester, Oklahoma. Phone 2382

FOR SALE

No. 9 Stearns Jolterete with Height Control, 2 Turntables, Power Carriage, Boom and Air Hoist with 4", 8" and 12" attachments. 4", 8" and 12" pallets.

40—72 Block Racks, Dunn Brick Machine with pallets, Racks and Skip Hoist.

Fairbanks-Morse Coal Stoker for 25 H.P. Boiler. All items priced for quick sale.

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ALSO SEE READY-MIXED CONCRETE AND CONCRETE PRODUCTS EQUIPMENT WHERE TO BUY ADVERTISING IN CONCRETE PRODUCTS SECTION

FOR VALUES — BUY BRILL

1—Vulcan 8'x125'x⅝" Rotary Kiln.
2—Reeves 7'x160'x⅝" Rotary Kilns.
2—Reeves 7'x120'x⅝" Rotary Kilns.
2—Allis Chalmers 9'x80'x⅝" Rotary Kilns.
1—Vulcan 8'x80'x⅝" Rotary Kiln.
1—Allis Chalmers 6'x60'x½" Rotary Kiln.
2—F. L. Smidth 4'x30', 4'x25'x½" Rotary Kilns.
1—Ruggles Cole 6'x50'x⅜" Rotary Dryer.
1—5'x67'x5/16" Rotary Dryer.
1—Vulcan 4'6"x50'x½" Rotary Dryer.
1—Williams "Super-Titan" 5 roll Mill, complete.
1—Nordberg 9'6"x11' Continuous steel-lined Ball Mill, 700 HP motor.
1—Complete Lime Hydrating Plant with 3 vertical Kilns, Sturtevant Lime Crusher, Kritzer Hydrator, Raymond Mill, Bucket Elevators, Bins, Packers, Compressors, etc.
1—Hardinge 4½'x16" steel-lined Conical Ball Mill, 30 HP motor.
1—Rogers 10"x16" Jaw Crusher.
5—Tyler Hummer Screens 4'x15', 3'x10', 3'x5' single and multiple deck.
1—Dixie #3650 Premier Hammer Mill, 100 HP motor.

SEND FOR DETAILS
Wire—Phone—Write

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Tel: Cypress 2-5703

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7 CUBIC YARD

WILLIAMS

GRAB

BUCKET

LIKE NEW

EXCELLENT CONDITION

THE BUNCHER COMPANY
835 SHORE AVENUE
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FOR SALE

2—D13000 Power Units, Skid Mounted, completely rebuilt, equipped with radiator and fan, open clutch and outboard bearing.

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WE ARE
SPECIALISTS IN HANDLING
USED PULVERIZERS
AIR SEPARATORS
DRYING EQUIPMENT

SELECTED USED EQUIPMENT NOW AVAILABLE
Includes Raymond Roller Mills, Imp Mills, Separators, and Automatic Pulverizers.

USED EQUIPMENT INC.
53 West Jackson Blvd. Chicago 4, Illinois

FOR SALE

Universal Model 3240 Portable Impact Master Complete with 3' x 12' Apron Feeder and shovel loading hopper, grizzly and by pass chute. "V" belt drives, powered by Murphy ME-66, 5th wheel and dolly, air brakes. All mounted on 12—10.00 x 20 pneumatic tires with complete inventory of space hammers, liners and wearing pacts to place mill in like new condition. This mill has produced only 250,000 cubic yards of stone.
Price, $24,000.00.

Wisconsin Foundry and Machine Company Portable Secondary plant equipped with 3' x 10' Jigger 2 deck vibrating screen, 42" x 24" rolls, pneumatic tires, ratovator wheel, powered by ME-66 Murphy Power Unit. Overhauled last fall.
Price, $12,500.00.

Both of the above units are an exceptional buy and must be seen to be appreciated.

ARTHUR OVERGAARD COMPANY
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FOR SALE

1942—45 TON PLYMOUTH FLEXIMOTIVE LOCOMOTIVE POWERED BY 6 CYLINDER COOPER BESSEMER DIESEL ENGINE. COMPLETELY OVERHAULED IN 1952.

WOULD CONSIDER A TRADE FOR:
STEAM LOCOMOTIVE CRANE
80 TON STEAM SWITCH ENGINE

TERRE HAUTE GRAVEL COMPANY, INC.
BOX 267
TERRE HAUTE, IND.

BUCKET LOADER
Haiss 75W, 3 yd. capacity, overhauled and in good operating condition.
Price: $4,500.00.

FLACK EQUIPMENT COMPANY
1240 McCOOK AVE., DAYTON, OHIO
Ph: ADams 8121

CRUSHERS: Gyratory 20", 36", 42", and 48". Nos. 12, 10, 9, 7½, 6, 5 Allis-Chal. and others.
JAW TYPE: 24x36, 25x40, 28x36, 40x48, etc.
CONE TYPE: Symons 2, 3, 4 and 5½'. No. 36 Telsmith. Also Kennedy 19, 25, 37 and 49. Traylor 1'6" and 2'4" TY. Newhouse 7, 10 and 14". Steadman 24, 30 and 36" Impact. Allis-Chalmers Ty. B.
ROLLS: Allis-Chal. 72x30, 54x24, 54x20, 40x16 and 18x10. Pioneer 18x30. Universal 16x24. New Holland 24x16 and 16x16. McLanahan 18x24 and 18x30.
HAMMERMILLS: Williams Nos. 2, 3, 4 and 6. Day Nos. 40 and 70. Gruendler 2XB and 3XB. Dixie 2040, 3650 and 5040, and others.
MILLS: Hardinge 3'x8", 6'x22", 6'x3' and 8'x4'. Kennedy 4x8, 5x6, 5x11. Marcy 4x5, 6x4, 7x16. Raymonds, Sturtevants and others.
CRUSHING PLANTS: 24x36, 20x40, 30x42 and smaller. Also complete stationary plants.
DRYERS: 90"x60', 7'x50', 10'x60', 8'x50'. Etc.
SCREENING PLANT: Large modern plant new in 1940, priced at ⅓ original cost.
DRAGLINES: Page 8 yd. 160' Bm.; Page 4 yd. 125' Bm.; 6W Monighan 5 and 7 Yd. 125'.
BINS & BATCHERS: 20 yd. capacity & larger.

MISCELLANEOUS ITEMS

Barges, Bins, Buckets, Boilers, Cableways, Cars, Compressors, Conveyors, Cranes, Dryer, Derricks, Draglines, Drag Scrapers, Dredges, Drills, Engines, Elevators, Excavators, Generators, Hoists, Kiln, Locomotives, Loaders, Motors, Pipe, Pumps, Rail, Scales, Screens, Slacklines, Shovels, Tanks, Trucks, Tractors, Etc., in many sizes, types and makes at low prices. (I have equipment at many points in the United States and Canada. What you need may be near your plant.)

MARIETTA ALEX T. McLEOD KANSAS

WE BUY AND SELL
BROOKS LOAD-LUGGERS

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UNIVERSAL 15x24 r.b. Portable Jaw Primary w/apron feeder, 24" underconveyor, gasoline power, on factory gooseneck frame w/single axle. $4500.
IOWA 18x36 r.b. Jaw Crusher w/3x8 apron feeder. A1. $5000.
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ALLIS CHALMERS 33"x6' "Aerovibe" 2-deck. New. $650.

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1—42"x16", 36"x16", and 24"x12" crushing rolls.
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1—42"x48", 24"x36", 18"x36", 15"x30", 12"x24" jaw crushers.
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1—20" x 10" New Holland Swing Hammer pulverizer.
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Centrifuge 54x70" solid bowl continuous.
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1—45 Ton Clyde Whirley Crane.
1—25 Ton G.E. Diesel Elec. Loco.
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42″ x 14″, 2 roll.

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1—P & H Model 700 Crawler mounted Crane, 1½ yd. capacity. Gas Power. Good all-around condition.
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1 Bay City Model 65 or 650 shovel attachment with 1¼ yd. shovel dipper. Practically new.
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Quantity	Belt Width, Inches	Length of Conveyor, Feet	List Price	Sale Price
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1	18	35	1559	814
1	18	50	2054	1043
1	18	85	3209	1581
1	18	125	4529	2096
1	24	30	1507	824
1	24	45	2062	1085
1	24	65	2721	1451
1	24	85	3542	1806
1	24	100	4097	2037
1	30	25	1421	806
1	30	35	1841	997
1	30	65	3101	1617
1	30	80	3731	2295
1	30	100	4571	2768
1	30	125	5621	2818

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3-roll Troughing Idlers for these sizes:

16″ belt	$17.25	30″ belt	$19.50
18″ belt	18.00	36″ belt	20.25
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18″	4	1/8″	1/32″	28 oz.	2.50/ft.
24″	4	1/8″	1/32″	28 oz.	3.23/ft.
30″	4	1/8″	1/32″	28 oz.	3.97/ft.

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20 Ton Truck Scales $525.00
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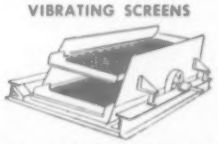

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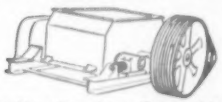

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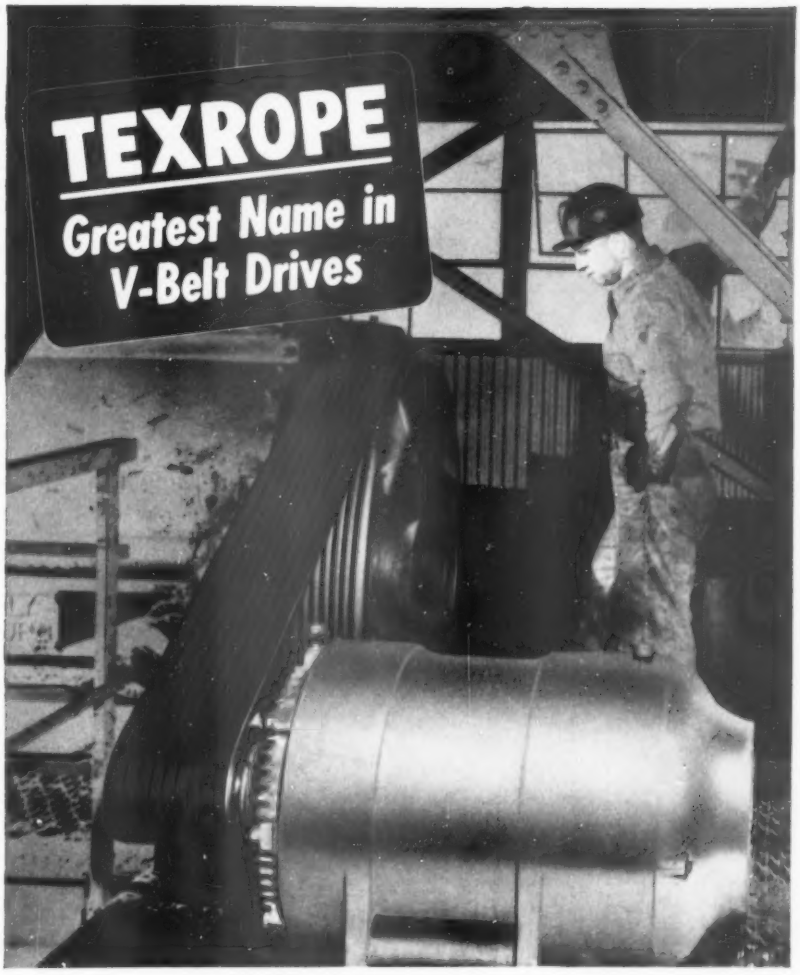

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STANDARD CAST IRON SHEAVES — Made to order from stock patterns. One to 14 grooves for A, B, C, D or E belts. One to 1000 horsepower. Split sheave or split hub.

***MAGIC-GRIP* SHEAVES** — Semi-steel casting with interchangeable, patented taper bushings. On and off in a jiffy. Cannot shake loose. Two to 12 grooves for B, C and D belts; 2 to 250 hp.

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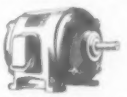
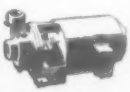
Serviced . . .

by Allis-Chalmers Authorized Distributors, Certified Service Shops and Sales Offices throughout the country.

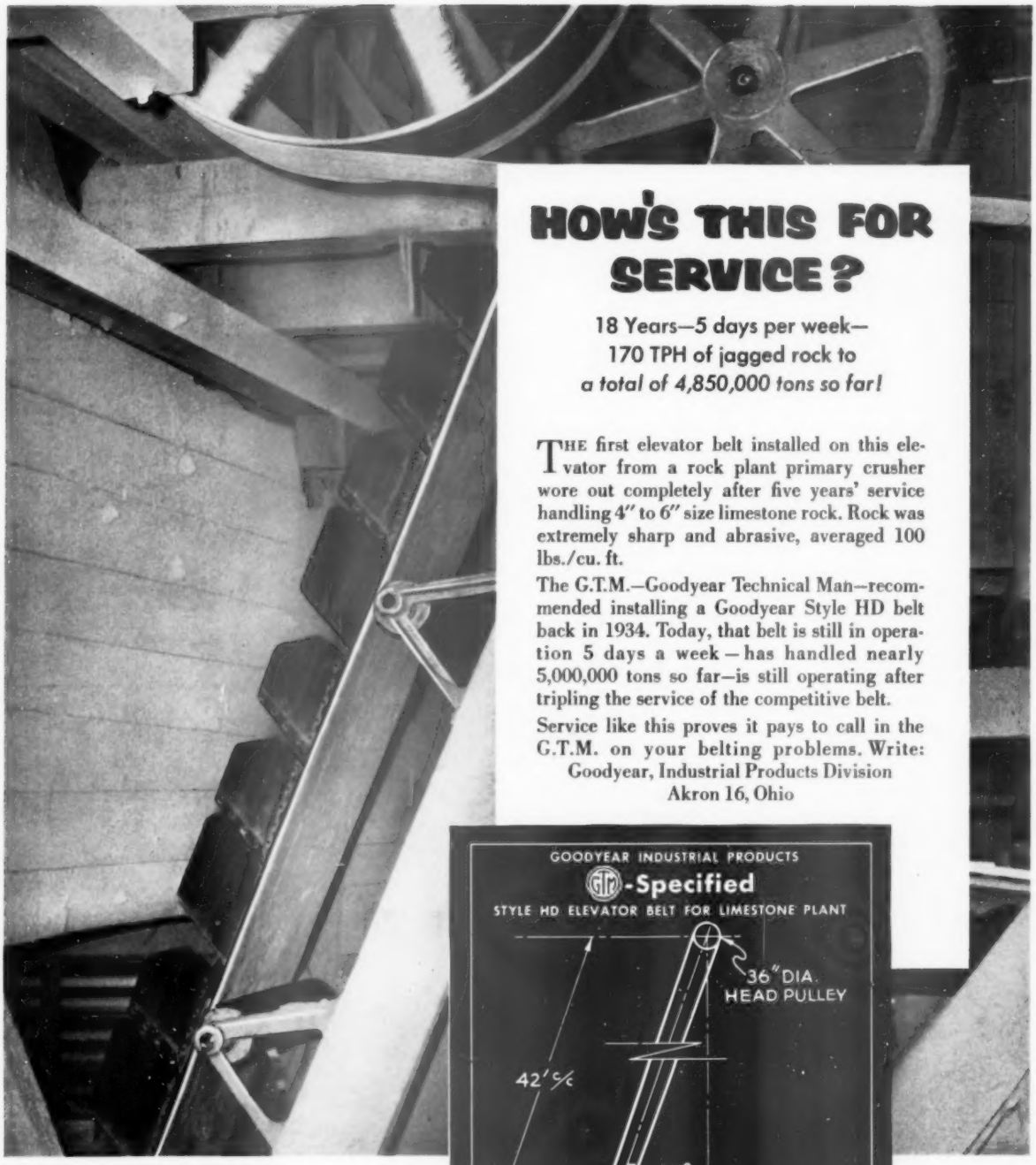


MOTORS — ½ to 25,000 hp and up. All types.

CONTROL — Manual, magnetic and combination starters; push button stations and components for complete control systems.



PUMPS — Integral motor and coupled types from ¾ in. to 72 in. discharge and up.



HOW'S THIS FOR SERVICE?

18 Years—5 days per week—
170 TPH of jagged rock to
a total of 4,850,000 tons so far!

THE first elevator belt installed on this elevator from a rock plant primary crusher wore out completely after five years' service handling 4″ to 6″ size limestone rock. Rock was extremely sharp and abrasive, averaged 100 lbs./cu. ft.

The G.T.M.—Goodyear Technical Man—recommended installing a Goodyear Style HD belt back in 1934. Today, that belt is still in operation 5 days a week—has handled nearly 5,000,000 tons so far—is still operating after tripling the service of the competitive belt.

Service like this proves it pays to call in the G.T.M. on your belting problems. Write: Goodyear, Industrial Products Division Akron 16, Ohio

YOUR GOODYEAR DISTRIBUTOR *can quickly supply you with Hose, Flat Belts, V-Belts, Packing, Tank Lining, Rubber-Covered Rolls: Look for him in the yellow pages of your Telephone Directory under "Rubber Products" or "Rubber Goods."*

GOODYEAR

THE GREATEST NAME IN RUBBER